# ACI News Letter

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# ACI

News Letter Contents

April 1957

On the Cover—Walter H. Price, head of the engineering laboratories, U. S. Bureau of Reclamation, Denver. Mr. Price assumed office as president of ACI at the recent convention in Dallas. Full story of the meeting begins on p. 4.


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## *ACI Awards Contract for Headquarters Building*

The next step in providing a permanent headquarters for the Institute comes with the announcement of the awarding of the building contract.

ACI's Board of Direction has announced Pulte-Strang, Inc., of Ferndale, Mich., as low bidder. Subcontractors selected were Southeastern Electric Co., United Heat Engineering, and Joseph P. Kropt, Inc. (plumbing), all of Detroit.

Walter H. Price, president, and William A. Maples, secretary-treasurer, signed the building contract on March 21 for the Institute.

The sleek design of ACI's future headquarters had already brought national honors to its architect, ACI member Minoru Yamasaki of Yamasaki, Leinweber & Associates, Royal Oak, Mich. The magazine *Progressive Architecture* recently picked the design as top winner in a commercial building category. Design features a folded-plate reinforced concrete roof system, cantilevered 19 ft front and rear from the monolithic concrete corridor walls. Privacy for the wide expanse of window glass will be provided by a garden wall of precast concrete masonry units.

The new headquarters will be 3 miles from the present leased office in northwest Detroit and will face a municipal golf course on W. Seven Mile Rd., providing an outstanding view, and in an area of newly-constructed homes and developing businesses. The building site, having 182 ft frontage, consists of two lots purchased in December 1955 and July 1956. Since then a Building Fund Committee has been soliciting contributions for the building under the direction of Henry L. Kennedy, chairman. Members of his committee are now intensifying their money-raising campaign (see Building Barometer, p. 26) to raise the balance of the $250,000 fund goal by voluntary gifts from members and industry so that Institute occupancy can take place in December 1957.

***ACI's 53rd annual convention:***

# *Details from Dallas*

ACI TECHNICAL COMMITTEE activities were spotlighted during the Institute's 53rd annual convention at the Statler Hilton Hotel, Dallas, Feb. 25-28, 1957.

Two new standards were adopted at the convention—one on the evaluation of test results of compressive tests of field concrete and another on standard practice for detailing reinforced concrete structures. One complete session was devoted to a report by the joint ACI-ASCE Committee 323 on Prestressed Reinforced Concrete. Two other ACI technical committees reported on hot weather concreting and painting of concrete. There were also more than 25 technical committees and subcommittees that held working sessions during the convention.

Other sessions were devoted to construction, design, materials, research, and lightweight aggregates. The motion picture session featured concrete construction and structural research. Of the many reports presented, six were devoted to construction projects and research in Texas.

More than 650 registered for the four-day meeting.

## *Technical Committee Day*

More than 25 technical committees and subcommittees held working sessions during the convention. Most of these were scheduled for Monday, February 25, which was designated as Technical Committee Day.

Various committees meeting were: Committee 115—Research, executive group only; Committee 207—Properties of Mass Concrete; Committee 208—Bond Stress; Committee 210—Resistance to Erosion in Hydraulic Structures; Committee 213—Properties of Lightweight Aggregates and Lightweight-Aggregate Concrete; Committee 214—Evaluation of Results of Compression Tests of Field Concrete; Committee 215—Fatigue of Concrete; Committee 312—Plain and Reinforced Concrete Arches; Committee 315—Detailing Reinforced Concrete Structures; and Committee 318—Standard Building Code.

Other committees were: Committee 323—Prestressed Reinforced Concrete, executive group only; Committee 324—Precast Reinforced Concrete Structures, Thin Section; Committee 326—Shear and Diagonal Tension; Committee 331—Structures of Concrete Masonry Units; Committee 332—Recommended Practice for Residential Concrete Work; Committee 333—Design and Construction of Composite Structures; Committee 605—Hot Weather Concreting; Committee 611—Inspection of Concrete; and Committee 612—Recommended Practice for Curing Concrete.

Committee 613—Recommended Practice for Proportioning Concrete Mixes held a meeting, as well as its two subcommittees, one on proportioning of lightweight aggregate concrete and one on proportioning of "no-

slump" concrete. Committee 614—Recommended Practice for Measuring, Mixing, and Placing Concrete, and Committee 621—Aggregates also met. Committee 622—Formwork for Concrete had a meeting of the full committee, as well as a meeting of subcommittee No. 1. Other meetings included Committee 711—Precast Floor Systems for Houses, and Committee 716—High-Pressure Steam Curing. The Reinforced Concrete Research Council also met during the convention.

Except for those committee meetings that were of the executive groups only, all of the meetings were open to those attending the convention and were well attended.

Administrative committees of the Institute that met during the convention were the ACI Building Committee, Board of Direction, and Technical Activities Committee.

## *Standards Adopted, Committees Report*

One new standard and one revised standard were adopted at the opening session of the 53rd annual convention, Tuesday morning, February 26. These standards now go to the ACI membership for letter ballot to be canvassed June 1, 1957.

The same session also featured reports from ACI Committee 605 and Committee 616. ACI president Frank Kerekes presided over the session. R. L. Thornton, mayor of Dallas and board chairman of the Mercantile National Bank, welcomed the Institute to Dallas and Texas.

### Committee 214 standard

Committee 214, William A. Cordon, chairman, presented the new standard "Proposed Recommended Practice for Evaluation of Compression Test Results of Field Concrete." As adopted it will now be referred to letter ballot of the ACI membership.

The committee's assignment is to analyze the variations which occur in the strength of concrete, to present tools of statistics which are useful in interpretation of these variations, and to discuss measures of reliability which can be used in establishing specifications and design criteria for the strength of concrete. The committee's first report appeared in the November 1955 ACI JOURNAL, and the proposed standard appeared in the December 1956 JOURNAL.

Statistical methods provide valuable tools for assessing results of strength tests, and such information is also of value in refining design criteria and specifications. The standard discusses briefly the numerous variations that occur in the strength of concrete and presents statistical methods which are useful in interpreting these variations. Criteria are offered in the report that can be used to establish specifications and maintain required uniformity.

### Committee 315 revised standard

Committee 315, Raymond C. Reese, chairman, presented for adoption the "Proposed Manual of Standard Practice for Detailing Reinforced Concrete Structures." It now goes to letter ballot of the ACI membership.

The committee had previously developed two publications: *Manual of Standard Prac-*

**DALLAS CONVENTION—Frank Kerekes, retiring president, left, discussed ACI's future with president-elect Walter H. Price**

*tice for Detailing Reinforced Concrete Structures (ACI 315-51)* and *Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures (ACI 315A-53)*. The committee has now reworked both publications so that they may be combined into a single manual.

The manual presents recommended methods and standards for preparing drawings for fabrication and placing of reinforcing steel in reinforced concrete structures. Typical engineering drawings (and, for buildings, placing drawings as well) illustrate the use of the standards.

In addition to combining the two previous manuals, the tables, text, and drawings have been corrected to embody the revisions contained in the new ACI Building Code (ACI 318-56). The other major change was the addition of a chapter which considers the designer's viewpoint. These changes were reviewed in the Committee 315 report published in the January 1957 JOURNAL.

### Committee 605 report

Stanton Walker, chairman of Committee 605, presented the progress report of that committee entitled "Hot Weather Concreting Problems." This report discussed the subject matter proposed for inclusion in a recommended practice now being drafted by the committee. Committee 605 was organized to review information on the effect of hot weather on the characteristics of fresh and hardened concrete and to develop a recommended practice for controlling ingredients, batching, mixing, transporting, placing, protecting, and curing concrete during hot weather. The progress report discussed, briefly, effects of concreting in hot weather, factors in minimizing hot weather difficulties, keeping concrete temperature down by controlling the temperature of its ingredients, production and delivery, placement and protection, and concrete testing. The report has been scheduled for early publication in the JOURNAL.

### Committee 616 report

G. E. Burnett, chairman of Committee 616—Coatings for Concrete, presented the latest report of that committee, entitled "Guide for Painting Concrete." The report, published in the March 1957 JOURNAL, describes types of paints, other than portland cement paint, commonly used on concrete. It reviews procedures for preparing the surface, selecting and applying the paint, and for repainting. Dampproofing and waterproofing are discussed briefly. A list of federal specifications for paints suitable for concrete is included.

The ACI Standard "Recommended Practice for the Application of Portland Cement Paint to Concrete Surfaces (ACI 616-49)" was also prepared by this committee.

## *Prestressed Concrete*

A full session on Tuesday afternoon, February 26, was devoted to a progress report of the joint ACI-ASCE Committee 323—Prestressed Reinforced Concrete. Thor Germundsson, chairman of the committee, presided.

Progress in the development of a "Recommended Practice for Prestressed Concrete" was reported and the material contained in the various chapters of a draft report was discussed.

The object of the report under preparation is to recommend those practices in design and construction which will result in prestressed concrete structures that are comparable both in safety and in serviceability to constructions in other materials now commonly used. The report will constitute a recommended practice, not a building code or specification.

The report is confined in scope to structural members involving linear prestressing; circularly prestressed members such as tanks and pipes are not covered. For the most part, the recommendations in the report will relate to flexural members—beams, girders, and slabs. Other structural forms, such as columns, ties, arches, shells, and trusses, are treated only briefly or not at all. The recommendations are intended to apply to both buildings and bridges.

E. L. Erickson, Bureau of Public Roads, vice-chairman of the committee discussed the report from the viewpoint of the highway engineer and covered applicable portions of the design chapter. Material in the draft report was covered by various members of the committee: C. P. Siess, University of Illinois, discussed the introduction to the report; M. J. Holley, Jr., Massachusetts Institute of Technology, discussed general aspects of the design chapter; W. B. Bennett, Portland Cement Association, covered details of the design chapter; Howard Simpson, Massachusetts Institute of Technology, reviewed the materials chapter; and M. Schupack, Preload Co., Inc., discussed the construction chapter.

The committee now plans to make necessary revisions in the draft report in the light of comments, suggestions, and discussion at the Dallas meeting.

## *Summaries of Convention Papers*

A brief synopsis of each of the papers presented at the Wednesday and Thursday sessions follows. It is anticipated that most of these reports will be published in forthcoming issues of the ACI JOURNAL.

The construction session, Wednesday morning, February 27, was under chairmanship of president-elect, Walter H. Price. Concurrent sessions were held Wednesday afternoon, February 27. Douglas McHenry, Portland Cement Association, presided over the design session and A. Allan Bates, Portland Cement Association, presided over the materials session. Thursday afternoon, February 28, featured a session on lightweight aggregates and lightweight-aggregate concrete, under chairmanship of J. Neils Thompson, University of Texas.

## Construction Session

**Design Criteria for Modern Concrete Specifications and Control**—Edward A. Abdun-Nur, Consulting Engineer, Denver, and Lewis H. Tuthill, California State Department of Water Resources, Sacramento

Accelerated construction, higher design standards, shortage of qualified technical personnel, and higher costs, are increasingly placing a premium on the application of manufacturing and industrial quality control methods to construction operations. To achieve this, it is necessary to start with specifications which have proper provisions for the quality control desired. To do this readily, it is necessary to design the control procedures and the specifications that will realize them as one unit. A procedure for utilizing "design criteria," modeled after structural design procedures, was advanced as a means to properly achieve this end.

An example of design criteria making use of "self-functioning" features, automation, contractor motivations, end-product provisions, use of reference specifications, uniformity requirements, investigation of local conditions and practices, use of statistical methods, use of labor-reducing features, elimination of expressions such as "approval of the engineer" which cannot be evaluated by the bidder, and in general deciding what is needed and requiring it clearly, was given.

These were applied to choice between materials of same class, lump sum items, increasing uniformity in aggregate handling and batching, statistical control of concrete strengths keyed to variability to motivate the contractor through cement saving, water-reducing agents, hot weather concreting, curing methods, truck mixing, and batch plants.

A forecast was given of future possibilities of automatic adjustments of batch water and aggregates, dewatering of sand, reducing water requirements of sand, and dialing mixes.

The importance of inspection as the key to transform specification provisions and quality

control requirements into realities was also stressed.

It was concluded that these features maintain a dynamic and progressive specification and quality control, which in the long run reduces over-all costs over copied specifications intended for conditions unrelated to the immediate problem that may be on hand.

**Construction of the Dallas Memorial Auditorium** — Jack E. Rosenlund, George L. Dahl, Architects and Engineers, Dallas

A structure of the Dallas Memorial Auditorium's type, shape, and size presented peculiar problems in design and construction, and introduced certain ideas and developments novel to long-span construction. Unusual design feature was the division of a 204-ft central, double-curved shaped roof into 16 separate pie-shaped sections. These were suspended from 45-ft rigid frames, cantilevering from 70 ft high columns and providing a 300-ft diameter clear area. Topics covered included structural considerations and design, formwork, concreting.

**Concrete for Sewage Works**—E. C. Wenger, Portland Cement Association, Chicago

Reviewed briefly characteristics of sewage which is in contact with sewer structures, and other conditions of exposure to which concrete is subjected in such construction. Corrosion of concrete in sewage works, where it occurs, is dependent on a combination of certain physical, chemical, and biological conditions, which result in a complex chain reaction.

It is possible to break this chain by controlling certain features in design, such as: (1) providing an adequate velocity of flow for the strength and temperature of sewage; (2) insuring proper ventilation of sewer; and (3) eliminating excessive turbulence in flow. Where conditions are such that these design requirements cannot be met, other means can be utilized: (1) use of chemicals to inhibit certain reactions; (2) use of compressed air to keep sewage fresh; (3) periodic cleaning of sewers to remove slime and prevent obstructions from reducing velocity; and (4) use of acid-resisting liners.

Selection of suitable well-graded aggregates, a low water-cement ratio, air entrainment, careful placement and thorough consolidation of concrete, and adequate curing are necessary essentials for quality of concrete required in sewage works.

**Prestressed Girder Roof for Hangar at Hill Air Force Base**—David P. Billington, Roberts and Schaefer Co., New York

The new cleaning and painting hangar at Hill Air Force Base, Ogden, Utah, is not particularly large, but it was designed for a special purpose and introduced some unique structural problems. An area 130 x 27 ft in plan and 38 ft of clear height was required, free from any interior columns. The air base is in an earthquake zone, and the structure is also subjected to high winds. The long span required a large, heavy, precast girder—84 tons. The wind and earthquake forces made it necessary to design the final structure as a rigid frame. A fully precast roof system was developed to eliminate high and costly scaffolding.

Concrete girders and roof panels were precast on the ground at the site. Girders were initially prestressed with 65 percent of their total prestressing force. Girders were lifted into place on the cast-in-place columns, precast roof panels erected, and the remaining 35 percent of the prestressing force was applied to girders.

## Design Session

**High-Strength Steel and Concrete Result in Minimum Column Sizes**—Frank W. Chappell, Consulting Engineer, Dallas

A luxury-type apartment hotel in Dallas, when completed, will be 24 stories high. To meet the demands of the type of occupancy for which the building is being built, the architect adopted a floor plan of what might be termed a pin-wheel shape, with exposed concrete columns and spandrel beams. Unusual shape of the exterior columns and the shortage of structural steel shapes made the use of a steel frame impracticable. And, since a concrete exterior was desired, it was decided to use this material for the entire structural frame.

**VICE-PRESIDENTS—Newly elected vice-president Phil M. Ferguson, left, checked over ACI convention program with senior vice-president Douglas McHenry at Dallas**

Three departures from conventional concrete design were adopted to maintain all of the clearances set out by the architect. These were: (a) use of lightweight concrete throughout; (b) use of high-strength concrete; and (c) use of high-yield-point alloy steel in columns below the sixth floor.

Since no long lines of deep beams could be had in the shorter direction, wind bracing was a major problem. This was solved by making heavy concrete shear walls surrounding the stair and elevator enclosures to supplement such stiffness as could be provided by the broken lines of the wind bents.

**Blast Resistant Design of Farmers Union Building**—S. Arthur Axtens, Consulting Engineer, Denver

A brief discussion of atomic blast effects preceded the description of the Farmers Union Building. The Farmers Union Building is practically a cube, in which the center of gravity is at center of the plan and approximately at third floor level. In the building the deep continuous floor slabs are reinforced at both bottom and top by steel which continues into the walls, which are also reinforced by steel at both faces so that the angle of intersection always remains a right angle; thereby the floor strengthens the wall and the wall strengthens the floor. Floors were cast monolithic with the wall spandrels and columns for the full height of section between window heads and sills, thereby creating a deep continuous girder entirely around the building at all floor levels. This in combination with short continuous columns produces a strong grillage or multiple unit rigid frame for all exterior walls. Walls and columns are a continuous unit of reinforced concrete in which the joints between castings were properly keyed and united by steel dowels, bars, and shear transfer units so that the entire structure functions as a steel reinforced monolith. Floors are of one deep ribbed slab, designed for continuity as indeterminate units in connection with walls, beams, spandrels, and columns and with ribs so placed that direct thrust, shears, and moments can be fully transferred and resisted. In addition to the strong exterior walls, there is an interior central core. All walls of this core are heavily reinforced at both surfaces. In addition to adding strength to the building, the core provides security against bombing for the building occupants.

**Strength of Slender Reinforced Concrete Columns**—Bengt Broms and Ivan M. Viest, Shell Oil Development Co., Houston, and University of Illinois, Urbana, respectively

The current ACI Building Code forbids the use of eccentrically loaded reinforced concrete columns with the length-to-depth ratio larger than 20. As most columns have

**COMMITTEE RESPITE—Shown relaxing from duties during convention were local committee members—William L. Cobb, Dallas consulting engineer, left; and Everett E. Knott, sales manager, Texas Lightweight Aggregates, Inc., Dallas, right**

some eccentricity, this provision prevents, in general, the use of slender reinforced concrete columns. It was therefore considered desirable to undertake a study of long columns for the purpose of examining the current design procedures.

First step in the investigation was the development of theoretical analyses for hinged and restrained columns taking into account the effects of increased lateral deflections due to loading and the limitation on strength imposed by buckling. The analyses were based on principles of buckling advanced by Euler, Engesser, Kármán, Westergaard, and Osgood, and on the behavior of short eccentrically loaded columns reported by Hognestad. The theoretical analyses were checked against the existing test data and then used as a basis for the development of simplified design procedure.

This presentation was a discussion of (1) principles of buckling, (2) exact evaluation of strength of long columns, (3) methods of design, and (4) comparisons of design procedures with available test data.

The following may be stated in summary: (1) Theoretical analyses were developed for computing the strength of long reinforced concrete columns, both hinged and restrained, loaded either with concentric or with eccentric loads. (2) A simplified design procedure was developed. It is based on the short column strength and a reduction coefficient. The procedure may be used either with the working load or with the ultimate load design. (3) For columns with equal end eccentricities the proposed reduction coefficient is the same as that included in the current ACI Building Code (ACI 318-56). The proposed coefficient calls for smaller reductions in columns with unequal end eccentricities. (4) The limit of $l/d = 20$ for eccentrically loaded columns included in the ACI Building Code (318-56) does not appear necessary. (5) Correctness of theoretical analyses for hinged columns and of simplified design procedures was verified by comparisons with existing test data.

**Design of Statler Hilton Hotel**—Wayman C. Wing; Seelye, Stevenson, Value, and Knecht, New York

In the Statler Hilton Hotel in Dallas, the flat plate cantilever contributed to the economical strength of the structure, and equally to esthetic and functional development of design. Studies revealed that a flat plate design was more economical than the conventional beam and slab system and that structural lightweight-aggregate concrete would offer further savings. Adequate resistance to wind forces was achieved by utilizing shear walls to act as vertical cantilevers resisting movement of floor slabs which were acting as a horizontal diaphragm. Lightweight concrete with a specified strength of 3000 psi at 28 days was used for all typical floor slabs. Columns were also lightweight concrete with a specified strength of 3750 psi at 28 days.

## Materials Session

**Laboratory Tests of Portland Blast-Furnace Slag Cements**—Bryant Mather, Concrete Division, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss.

Laboratory tests of samples of portland blast-furnace slag cements, and of the blast-furnace slags and portland-cement clinkers used in their manufacture, obtained from each of the mills making them in the United States in 1955, indicate that the then current federal

and ASTM specifications provide adequate assurance of performance at least equal to that insured of Type I portland cements by applicable specifications. Portland blast-furnace slag cements, meeting specifications, frequently have low enough heats of hydration to meet optional heat of hydration requirement for Type II portland cement of federal specification. The specifications for portland blast-furnace slag cements do not insure that they will have moderate sulfate resistance, as required of Type II portland cements. Performance of an experimental portland blast-furnace slag cement containing a higher percentage of magnesia than permitted by the specifications, made with a high-magnesia (9.6 percent) slag, was not found to have been adversely affected. Mortar-bar tests suggest that the presence of the slag in the cement acts to keep expansion due to alkali-aggregate reaction from becoming excessive even when a highly reactive aggregate is used and the cement contains more than 0.6 percent alkalies calculated as sodium oxide.

**Utilization of High-Lime Fly Ash in Concrete**—R. H. Breckenridge, Texas Power and Light Co., Dallas

While most fly ash comes from coal, the Rockdale fly ash (produced at the Rockdale Works of the Aluminum Company of America) has its origin in lignite. The lime content of about 22 percent is unusually high when compared with other fly ash used in concrete. To confirm laboratory studies, the high-lime fly ash was used in two major projects, which were planned and controlled in such a way as to determine the effect of the fly ash in concrete. For both projects, concretes using 5, 5½, and 6 bags of cement per cu yd were used as basic design. For each of these basic designs, Rockdale fly ash was substituted for 0, 10, 20, and 30 percent of the cement by absolute volume.

Based on the test results the following conclusions were reached: (1) Provided the equivalent of 28 days standard curing is supplied, Rockdale fly ash can be substituted for portland cement in 5- to 6-bag concrete up to at least 30 percent. (2) Substitution of high-lime fly ash in concrete will probably improve the 90-day strength, the 28-day strength probably will not be affected, while the 7-day strength may be slightly reduced. (3) Workability will be improved. (4) Water content may be reduced, contributing to additional gain in strength.

**Study of Concrete Pipe in Service**—W. J. McCoy, R. J. Sweitzer, and M. E. Flentje, Lehigh Portland Cement Co., Lock Joint Pipe Co., and American Water Works Service Co., Inc., respectively

Because of publication of various technical papers, mostly in foreign journals on the subject of leaching action of water on concrete pipe with special references to removal of lime, considerable interest has developed

## *Looking ahead to '58*

With the successful completion of the 1957 convention in Dallas, ACI's Technical Activities Committee is already looking toward the 1958 meeting in Chicago and planning the program.

All those who intend to offer papers for presentation at the 54th annual meeting should write to Institute headquarters before July 1, furnishing a synopsis which should make clear the scope of the paper and indicate features that, in the opinion of the author, will justify its inclusion in the program. Contributors should have first drafts of manuscripts in the hands of the Technical Activities Committee for appraisal and acceptance by Sept. 15, 1957, and final manuscripts by Jan. 1, 1958.

From the replies received and suggestions from other sources, TAC will select the papers to make up each convention session.

**Write Institute headquarters now about the papers you want to see on the 1958 program.**

regarding condition of concrete pipes that are in service in this country.

Portions of concrete pipe were removed from five existing water lines and analyzed to determine the extent of any leaching of lime that might have occurred. The five selected samples represented various types and ages of pipe as well as exposure to waters possessing several degrees of aggressiveness.

The cementitious structure of all test specimens was sound and appeared to be well bonded to the aggregate. Except for a very thin inside surface layer usually of the order of 0.03 in., none of the samples had experienced any significant leaching of lime. This conclusion was based on the fact that the cement lime ratio of the inner and outer portions of each pipe sample were almost identical. This was further confirmed by cutting the pipe wall with a diamond saw into six thin sections from the inside out and analyzing each section for the cement/lime ratio.

**Effect of Temperature on Concrete Strength**—Paul Klieger, Portland Cement Association, Chicago

This study was prompted by the need for more detailed information on the influence of temperature during mixing, placing, and curing on concrete strength development. Specific information was sought as to the compressive and flexural strengths produced by different types of portland cement when used in concretes mixed, placed, and cured at various temperatures ranging from near the freezing point to 120 F. Information as to effects of an accelerator under these different conditions was also investigated. Another aspect of the problem investigated was that of the influence of cement temperature on concrete strength.

## Lightweight Aggregate Session

**High-Pressure Steam Curing of Lightweight-Aggregate Concretes**—Rudolph C. Valore, Jr., Texas Industries, Inc., Dallas

Machine-made hollow concrete block, plastic structural concretes, and foamed cellular concretes were cured in high-pressure steam. Binders consisted of portland cement, lime, and blends of cement and lime, used with minus No. 200 sieve silica flour in amounts ranging from zero to 150 percent, by weight of the cementitious ingredient. Aggregates were expanded shales and clay, produced commercially in rotary kilns, and, for some of the foam concretes, expanded perlite. The curing cycles included 6 hr at constant pressure (145 psi) and temperature (355 F).

Properties studied included compressive and flexural strengths, modulus of elasticity, drying shrinkage, and water absorption. Compressive strengths of mixtures containing silica were generally higher than for those without silica, but this advantage was greatest for mixtures having the highest ratios of binder to fine aggregate. For all three types of concrete, the strength 24 hr after curing in high-pressure steam for mixtures containing silica was equal to or greater than the 28-day strengths after normal curing of mixtures without silica, but of comparable binder (cement plus silica) contents. Drying shrinkage of the high-pressure steam cured concrete was generally appreciably lower than that of comparable concrete cured at ordinary temperatures.

**Lightweight-Aggregate Concrete for Structural Applications**—J. J. Shideler, Portland Cement Association, Chicago

This report described tests employed and results obtained in an investigation of properties of lightweight-aggregate concrete of structural quality. Eight lightweight aggregates and one normal weight sand-and-gravel aggregate were included. Total program included tests of plain, conventionally reinforced, and prestressed concrete specimens, but except for pull-out tests of reinforcing bars, only data on plain concrete were reported. Data were reported on concrete mix proportions, compressive and flexural strength, modulus of elasticity, bond, creep, and drying shrinkage. Concrete mixes were designed to produce compressive strengths of 3000 psi and 4500 psi with each aggregate and 7000 to 10,000 psi with three selected aggregates.

Comparing various concretes on the basis of equal compressive strengths, sand and gravel showed somewhat superior perform-

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ance in most of the tests. In many structural applications, however, this superiority will doubtless be overshadowed by advantages resulting from reduced unit weight of lightweight-aggregate concretes.

**Lightweight Expanded Shale Aggregate in Prestressed Concrete**—R. A. McCann, Basalt Rock Co., Inc., Napa, Calif.

Test reports included: (1) loaded cylinders—creep curves of different mixes and stresses; (2) pre-tensioned prisms—total deformation and bond length curves of different mixes and stresses; and (3) tests of structural members. Losses under pre-tensioning versus post-tensioning and how they differ in lightweight and normal weight concrete were discussed. Various applications of lightweight aggregate in pre-tensioned and post-tensioned projects were described, including cored bridge slabs, box bridge slabs, channel bridge slabs, beams for simple and cantilever spans in buildings, double-tee slabs, and continuous floor slabs.

**Batch Design, Control, and Field Practice for Lightweight Concrete**—Truman R. Jones, Jr., and Henson K. Stephenson, Texas A & M College, College Station, Texas

The most common problems encountered in batch design, handling, placing, and finishing of structural quality concrete made with uncoated expanded shale and clay aggregates were discussed. A simple method was presented for design and control of concrete batch. Practical solutions for certain of the field problems frequently experienced in handling, transporting, and stockpiling the aggregates and in handling, placing, and finishing the concrete were given.

## *Research Committee Session*

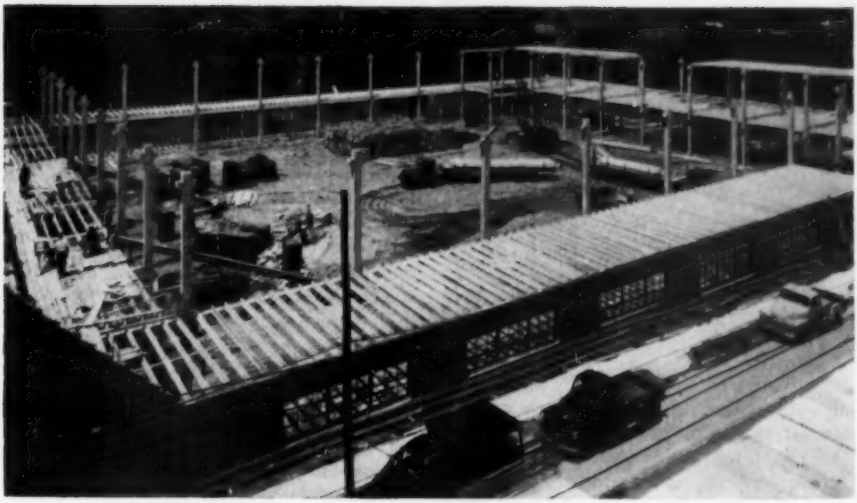
Committee 115, Research, which sponsored the session Thursday morning, February 28, is assigned "to review and correlate research in concrete and reinforced concrete and to consider research methods and objectives." The committee has attempted to fulfill this assignment through the research sessions at the annual conventions, through the distribution of the annual compilation of research projects under way at the various laboratories, and through limited correspondence among committee members.

The annual compilation is divided into four parts. The first part gives the names of all educational institutions that are carrying out concrete research and lists the projects that they are working on. The second and third parts provide similar information for non-educational organizations and for foreign institutions, respectively. In the fourth part the projects are classified under subject headings. This year, 77 organizations from all parts of the United States and from several foreign countries reported to the committee. These organizations included universities, highway departments, federal departments, cement companies, industrial laboratories, commercial laboratories, and various associations. The reporting organizations listed 556 different projects under way, which covers all phases of research in the fields of aggregates, admixtures, cements, and plain and reinforced concrete. If you did not secure a copy of this compilation at the Dallas convention, you may do so by writing ACI headquarters.

The eleven excellent papers presented at the research session in Dallas covered a large variety of topics.

### Synopses provided by program participants

"Properties of Concrete Containing High Percentages of Chlorides When Cast and Cured at Extreme Low Temperatures," by L. J. Mitchell, U. S. Bureau of Reclamation, indicated that tests were made to determine feasibility of mixing and placing concrete at temperatures as low as 5 F. A series of mixes included concretes containing 22½ percent chlorides in the mixing water. Specimens were cast at 5 F for curing at 5 F and at 73 F for 28 days. Concrete specimens without chlorides were similarly cured and tested. Data were presented and discussed on the



Upper photo: Finishing plant is 196 feet by 296 feet and two stories high.

Lower photo: A portion of the manufacturing plant, 270 feet by 259 feet, which is two, three and four stories high.

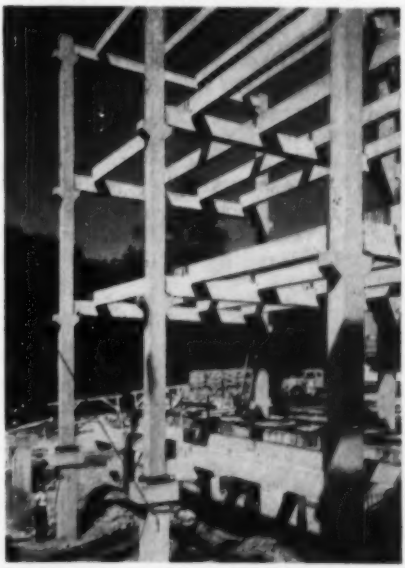
## PRECAST STRUCTURAL CONCRETE
and
## LEHIGH EARLY STRENGTH CEMENT

These two buildings provide a good example of the adaptability—and rapidly increasing use—of precast concrete for all types of structures. Built for the B. F. Huntley Furniture Co., Winston-Salem, N. C. they have 246,000 square feet of floor and roof area, framed entirely with precast concrete columns, beams and joists.

In the precasting of these members, Lehigh Early Strength Cement was used to achieve maximum production efficiency and economy.

"Structural members which were cast one day were stripped from their forms the following day and moved to storage," writes Mr. W. D. Shea of the Arnold Stone Company. "By using Lehigh Early Strength Cement, the precasting operation was completed in 50% of the time which would have been required had we used regular portland cement."

This is typical of the advantages of Lehigh Early Strength Cement in modern concrete construction.



Consulting Engineer: WALTER PREIMATS, Asheboro, N. C.
General Contractor: FRANK L. BLUM CO., Winston-Salem, N. C.
Contractor for precast columns, beams and joists: ARNOLD STONE CO., Greensboro, N. C.
Concrete for precast members furnished by: READY MIXED CONCRETE CO., Greensboro, N. C.

- LEHIGH EARLY STRENGTH CEMENT
- LEHIGH MORTAR CEMENT
- LEHIGH PORTLAND CEMENT
- LEHIGH AIR-ENTRAINING CEMENT

**LEHIGH PORTLAND CEMENT COMPANY** ALLENTOWN, PA.

**CONVENTION BUSINESS—Happily noting registration figures and scope of convention program at Dallas were Frank Kerekes, left, retiring ACI president and Cedric Willson, chairman of local ACI convention committee, seated on the right**

basis of freeze-thaw durability tests, compressive strength, Young's modulus, and length change measurements.

"Effect of Block Patterns on Structural Properties of Masonry Walls" was reported by J. A. Hanson, Portland Cement Association. Eccentric compression and flexural tests were made on 36 unreinforced concrete block walls. These walls were laid in nine different architectural patterns using both high- and low-strength mortar. Flexural failure was achieved under uniform lateral pressure. Six of the flexural walls were retested with the two types of loading combined. Deflections and inelastic set were observed.

Under eccentric compression all walls exhibited load capacities far beyond those forces which would be normally imposed by a bearing wall structure. The flexural tests reflected relatively large range in bond strength.

"Some Studies on Prestressed Concrete Simple and Continuous Composite Beams," by A. M. Ozell, University of Florida, indicated that for simple beams 15 prestressed composite specimens were tested to study the effect of various contact surfaces and the effect of shear ties upon the behavior of composite beams.

Also two-span continuous beams having several cross sections were tested to determine the degree of continuity obtained by tying two simple beams over the support by using mild reinforcement in the cast-in-place portion of the composite beams. The program included the testing of six continuous beams.

"Shear Strength of Simply-Supported Reinforced Concrete Beams under Uniform Load," by C. P. Siess, University of Illinois, reported tests on 18 simply-supported beams $6 \times 12$ in. in cross section. Uniform load was simulated by ten equally spaced concentrated loads. Variables were: $L/d$ from 6 to 15.5; steel percentage from 1.0 to 3.4; and $f_c'$ from 2700 to 6600 psi. The use of high-yield-point reinforcement insured failures of the shear-compression type in all but two beams. Empirical expressions were derived for the load causing first diagonal cracking and for the ultimate strength in shear.

In addition to the papers above the following reports were presented: "Tests of Concrete Containing Portland Blast-Furnace Slag Cement," by Harold Allen, Bureau of Public Roads; "A Nuclear Magnetic Resonance Moisture Meter," by William L. Rollwitz, Southwest Research Institute; "Strength Variations in Cement," by Stanton Walker, National Ready-Mixed Concrete Association; "Investigation of Instruments for Measurement of Pore Pressure in Concrete," by Thomas B. Kennedy, Waterways Experiment Station; "A Theoretical Approach to the Fire Endurance of Concrete," by James V. Ryan, National Bureau of Standards; "Anchorage Characteristics of Strands in Pretensioned Prestressed Concrete," by George A. Dinsmore, Lehigh University; and "Reinforced Concrete Knee Connections in Tension and Compression," by George C. Ernst, University of Nebraska. Synopses for these projects were not made available for release.

## Suggestions to the committee

Since the committee is anxious to have complete coverage of all research projects in its next compilation, all persons having suggestions or knowing of omissions are urged to initiate correspondence at once. No information will be given any publicity without the permission of the correspondent. Address your suggestions and inquiries to:

Prof. Stephen J. Chamberlin
Secretary, ACI Committee 115
T & A M Laboratory
Iowa State College
Ames, Iowa

# *Walter H. Price Elected President*

At the Wednesday Awards Luncheon tellers announced results of balloting of ACI members for president, one new vice-president, and four new members of the Board of Direction.

Walter H. Price, head of the engineering laboratories, U. S. Bureau of Reclamation, Denver, was elevated to the Institute presidency. He succeeds Frank Kerekes, Dean of Faculty, Michigan State College of Mining and Technology, Houghton.

Phil M. Ferguson, chairman, Department of Civil Engineering, University of Texas, was chosen vice-president for a 2-year term. Douglas McHenry, director of development for the Portland Cement Association, Chicago, elected at the 1956 convention to a 2-year term as vice-president, will continue in that office.

Chosen for 3-year terms as directors were William H. Armstrong, consulting engineer, Atlanta; Robert C. Johnson, president, Siesel Construction Co., Milwaukee; Raymond C. Reese, consulting engineer, Toledo, Ohio; and C. D. Wailes, Jr., president, C. D. Wailes Co., Sun Valley, Calif.

A 1930 civil engineering graduate of Tulane University, Mr. Price has been with the Bureau of Reclamation since that year, and at the Denver laboratories since 1934. His work there includes materials testing and research problems related to the construction of large concrete dams and irrigation works. He was head of the bureau's materials laboratory before assuming his present position.

An ACI member since 1937, Mr. Price has just completed a two-year term as vice-president, and was an ACI director from 1951 to 1953. Presently chairman of ACI's Standards Committee, he is also a member of three other ACI technical committees.

Author of several ACI JOURNAL papers, Mr. Price received the Wason Medal for "the most meritorious paper" in 1951 for his work entitled "Factors Influencing Concrete Strength."

Professor Ferguson joined the the faculty of the University of Texas in 1928 as associate professor in structures and materials. He became professor in 1939, and chairman of the civil engineering department in 1943. Previously he had spent several years with Dwight P. Robinson and Co., New York, in structural design of power plants and industrial buildings, and construction of hotels and apartment buildings.

A former member of the Board of Direction and presently a member of the Technical Activities Committee, Professor Ferguson joined ACI in 1930. The author of seven ACI JOURNAL contributions, he was awarded the

**LOCAL COMMITTEE—Extending hospitality to the more than 650 convention goers at the Dallas program were local committee members (from left): James D. Irwin, engineer, Wamix-Wesco; Jack E. Rosenlund, chief structural engineer, George L. Dahl, architects and engineers; and Joe Williams, engineer Portland Cement Association; all from the Dallas area**

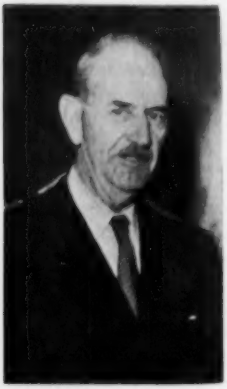
Wason Medal for Research with J. Neils Thompson for their 1953 paper, "Diagonal Tension in T-Beams without Stirrups."

## Nominating Committee

The five members elected to the nominating committee were: Boyd G. Anderson, Ammann and Whitney, Consulting Engineers, New York; H. K. Cook, director of engineering, Master Builders Co., Cleveland; Roger Corbetta, president, Corbetta Construction Co., Inc., New York; Thor Germundsson, manager, Structural and Railways Bureau, Portland Cement Association, Chicago; and T. Y. Lin, professor of civil engineering, University of California, Berkeley. The remaining three members of the committee are past presidents Charles H. Scholer, Charles S. Whitney, and Frank Kerekes.

# *Arthur R. Lord Named Honorary Member*

Arthur R. Lord, Palos Park, Ill., a past president of the Institute, was elected an honorary member of the Institute.



A pioneer in Institute affairs and in concrete design practices, Arthur R. Lord has contributed mightily to both. In addition to contributing many papers to the *Proceedings*, his personal sketches "Fellows of the Institute," in the "News Letter" of early JOURNALS were, and are, fine expressions of his great personal insight and knowledge. The inception of the present JOURNAL itself is largely due to his efforts. Mr. Lord represented the Institute on the Second (1924) Joint Committee and was chairman of the ACI Building Code Committee. His "Handbook of Reinforced Concrete Design" (1928) was widely circulated and added prestige to ACI Building Codes as never before.

Besides serving as chairman of a number of Institute technical committees, Mr. Lord was active and influential on the Advisory Program, and Publications Committees and the Board of Direction.

Aside from Institute-related activities, Mr. Lord made other important contributions to the progress of concrete. He instigated, and carried through the first actual loading test of a building as a basis for stress analysis. This was followed by several others in which the then-new Berry strain gage was used. During the 1920's he was the world authority on flat slab design.

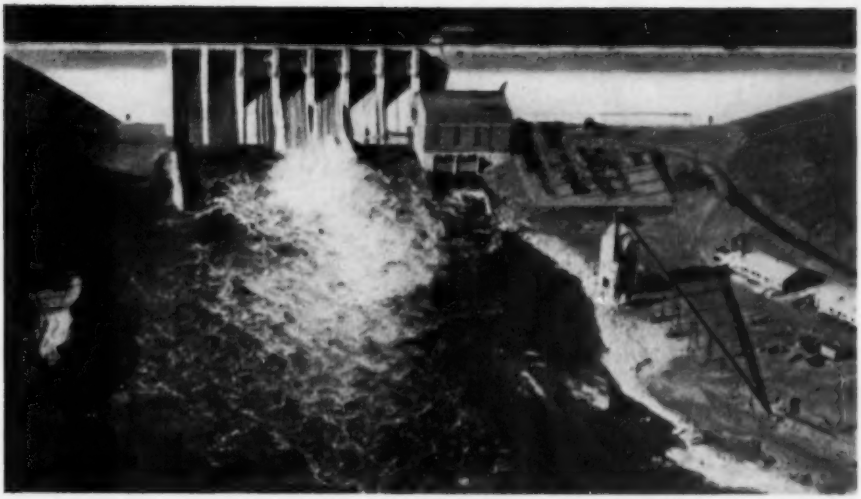
Thus through his great personal interest in the American Concrete Institute and in the advancement of engineering knowledge Arthur R. Lord contributed immeasurably to the enhancement of both.

In receiving the certificate of honorary membership Mr. Lord reviewed briefly some of his experiences in concrete design, construction and research, emphasizing the benefits that can be gained by working in and for the American Concrete Institute.

He said, "The Institute has no way of knowing and reporting what is currently new and exciting and important in concrete, except through its members." He noted that in research work an important part of that work is getting the data and conclusions published—many times in ACI publications—but that in designing offices and in the field, many fine opportunities for good papers are "going to waste." He emphasized the desirability, and often times necessity, of making this knowledge available to the industry as a whole through publication by ACI.

"Keep your eyes ever open to recognize the new and important and exciting that may be happening in your office or on your job," he said, and urged writing it down for consideration for publication by the Institute.

*Convention story—continued on p. 21*



New England Hydro-electric Power Plant and Dam

## Make your concrete more durable and exposure-resistant with AEROLITH air-entraining agent

**Aerolith is ready for use at the ready-mix plant or at the construction site.**

Over two hundred thousand cubic yards of concrete were used to build this New England hydro-electric power plant and dam. Every yard contained Aerolith—a chemically stable and rigidly controlled air-entraining agent.

These are the advantages of using Aerolith:

- concrete is more resistant to drastic temperature changes, is protected against frost damage.
- improves workability, mixing, placing.
- minimizes segregation, honeycombing.
- increases wetting ability of water, permits reduced water-cement ratio for a given slump.
- reduces bleeding; speeds finishing.
- increases resistance to water absorption and corrosive effects of salts, sea- and mineral-water.
- Aerolith is compatible with other admixtures.

**GOVERNMENT TESTED.** Aerolith has been tested and approved by the U. S. Bureau of Reclamation and many State Highway Commissions. Since 1948 it has been used on numerous projects in the U.S.A. and abroad (names on request). In these projects long-term durability and resistance to disruptive effects of freeze-thaw cycles were specified.

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COMPANY.....

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# EXPOSED CONCRETE AGGREGATE

for

- BONDING SURFACE AT CONSTRUCTION JOINTS
- DECORATIVE ARCHITECTURAL EFFECT

## RUGASOL-F

**RETARDANT FORM COATING**

Rugasol-F is painted directly on formwork. When forms are stripped (2 to 5 days), the retarded surface mortar is removed with a jet of water or stiff brush.

(Rugasol-F was formerly designated Sika RFC #2 water-insoluble grade)

## RUGASOL-C

**RETARDANT CONCRETE COATING**

Rugasol-C is applied on the surface of freshly placed concrete. On the following day, the retarded surface mortar is removed with a jet of water or stiff brush.

(Rugasol-C was formerly designated Sika RFC water-soluble grade)

**You will find it easy to expose concrete aggregate with the Rugasol method. Rugasol eliminates the need for costly chipping, hacking, sand-blasting and acid washing on new construction work.**

**Write or call today for detailed information.**

PLASTIMENT CONCRETE DENSIFIER—IGAS JOINT SEALER
RUGASOL (for exposed aggregate)—SIKACRETE ACCELERATING Ddensifier

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***Convention story continues:***

## *President Kerekes Reviews Year's Activities*

In his address at the Awards Luncheon, retiring President Kerekes reviewed the Institute's 1956 activities. He noted that one out of every ten ACI members gratuitously contributes of his talent, time, and energy to Institute activities so that science, technology, and practice in the use of concrete and reinforced concrete may keep abreast of new and improved developments.

Work of the Institute is actively carried out by more than 500 members serving on 35 committees, President Kerekes noted. In addition there is ACI official participation in the work of 18 committees of other organizations.

He reviewed briefly the growth of ACI membership during the past year and expressed belief that on the basis of the large number of people active in the field of concrete and reinforced concrete, Institute membership may total 16,000 by 1967. Sources of membership applications were enumerated as shown below.

He also reviewed the year's finances, Institute publications and standards, formation of new technical committees during the year, and the ACI building project.

For President Kerekes' complete address, the reader is referred to page 913 of this month's JOURNAL.

### SOURCES OF APPLICATIONS

| | |
|---|---|
| Individual member efforts | 452 |
| JOURNAL applications | 377 |
| Requests for information and publications prospects | 376 |
| Technical Director's activities | 141 |
| Rosters and mailing lists | 103 |
| Convention and Regional Meeting | 94 |
| Nominations by ACI members | 59 |
| Direct applications | 39 |
| Total applications | 1641 |
| Less losses | 584 |
| Net gain | 1057 |

## *Concrete Films*

*Films devoted to structural research, concrete testing and materials, and construction techniques with particular emphasis on precast elements were shown to ACI convention-goers at the Tuesday evening movie session, February 26.*

*George C. Ernst, professor of civil engineering, University of Nebraska, Lincoln, presented and narrated two films concerned with an investigation of reinforced concrete in the plastic range of loading, sponsored by the National Science Foundation, the University of Nebraska Research Council, and the University of Nebraska Foundation.*

*A film on the Lake Ponchartrain Bridge in Louisiana, produced by Ideal Cement Co., was introduced by Robert F. Blanks, vice-president and general manager, Great Western Aggregates, Inc., Denver. The film illustrated assembly line methods for production of the precast prestressed parts of the bridge as well as erection of the bridge itself.*

*"Inside Story of Concrete," produced by the Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss., showed by live photography and animation, the investigational work required for the production of high quality mass concrete.*

*Arthur R. Anderson, consulting engineer, Tacoma, Wash., narrated a film on precast and prestressed concrete. Production and erection techniques were illustrated.*

# Darex Diary

*by Henry L. Kennedy*
*Member, American Concrete Institute*
*Manager, Construction Products*
*Dewey & Almy Chemical Company*

**A look at new techniques and developments in concrete construction.*

Frequently I wonder if we are all fully aware of the tremendous amount of research and development that is being directed toward improvements in concrete construction.

As an illustration, consider the mortar air meter that is under final test during construction of the St. Lawrence Seaway Project. This apparatus is intended to measure directly the air content of the mortar in concrete by pressure method. It is pretty generally agreed that it is the air content of the mortar that counts as far as durability is concerned; and if the mortar meter performs as the designer intends, this will be one more step toward advancing the technology of concrete.

Engineers in the Illinois Highway Department have developed a technique to measure the air contents of hardened concrete by pressure methods. Employing a hydraulic ram and pressures up to 5000 psi., the air content is measured by recording the amount of water that is forced into the voids in the concrete. As with the linear traverse method —whereby the voids in air entrained concrete are determined by actual count—the high pressure air meter provides another and much speedier means to evaluate hardened concrete in a post-construction investigation.

Continued research and investigation in the field of concrete control is evidenced by the work that has been done in recent years toward development of the "ball" penetration test to measure concrete consistency. The ball test is simple to perform and has the advantage of permitting fast consistency determinations to be made "in place", without disturbing the concrete. This feature is helpful in spotting segregation and premature stiffening and also allows consistency checks to be made at any point in the concreting operation. The results of participating and cooperative effort on the part of a large ready mix producer on the West Coast, several state highway departments, the Corps of Engineers, and the University of California are manifested in the recent adoption of the method as a tentative standard by ASTM.

There are many, many other instances that I could cite, but space permits only brief mention of a few: (1) An electronic indicator for DAREX AEA dispensers has just been developed by our distributor in Illinois. The instrument is a visual aid to the batch operator that tells him by an indicator light that the DAREX AEA has been properly dispensed into the mixer. (2) Our DAREX AEA distributor for Kentucky is working closely with state highway officials in that state conducting tests to develop optimum field techniques to restore badly eroded concrete bridge decks. DARAWELD is used as the agent to bond the overlay to the old concrete. (3) Our distributor for the northwest is currently improving a DAREX AEA dispenser for paving mixers that they developed a few years ago.

All along the line—our Dewey and Almy technical research staff, sales personnel, and manufacturing people—are constantly joining with engineers and contractors in the search for improvements in techniques and apparatus used in the field of concrete construction.

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## *Convention Statistics . . .*

1957 ACI convention registrants came as far away as Iraq for the Dallas sessions. A civil engineer from Baghdad, Nezir A. Kirdar, visiting for 9 months in the United States under an Eisenhower Exchange Fellowship, made a special trip to Dallas for the meetings.

Texas had the largest representation at the convention. Forty-one other states, Canada, District of Columbia, Cuba, and Puerto Rico were represented. The complete breakdown of convention-goers is as follows:

| | |
|---|---|
| Texas | 166 |
| Illinois | 66 |
| New York | 46 |
| Canada | 38 |
| California | 36 |
| Ohio | 32 |
| Michigan | 25 |
| Pennsylvania | 24 |
| Missouri | 23 |
| Louisiana | 22 |
| District of Columbia | 19 |
| Colorado | 18 |
| Oklahoma | 17 |
| Wisconsin | 13 |
| New Jersey | 11 |
| Kansas | 9 |
| Georgia | 7 |
| Indiana | 7 |
| Alabama | 6 |
| Florida | 6 |
| Iowa | 6 |
| Maryland | 6 |
| Tennessee | 6 |
| Minnesota | 5 |
| Kentucky | 4 |
| Massachusetts | 4 |
| New Mexico | 4 |
| Mississippi | 3 |
| Nebraska | 3 |
| Utah | 3 |
| Virginia | 3 |
| W. Virginia | 3 |
| Arizona | 2 |
| Connecticut | 2 |
| Cuba | 2 |
| N. Carolina | 2 |
| Oregon | 2 |
| S. Carolina | 2 |
| Washington | 2 |
| Arkansas | 1 |
| Delaware | 1 |
| Idaho | 1 |
| Iraq | 1 |
| Maine | 1 |
| Montana | 1 |
| N. Dakota | 1 |
| Puerto Rico | 1 |

## *Award Recipients Feted at Luncheon*

1957 award winners who were present to be honored at the Wednesday convention luncheon were Albert T. Goldbeck, Raymond C. Reese, Lewis H. Tuthill, William A. Cordon, Kenneth R. Lauer, and Roy R. Clark. Floyd O. Slate, Wason medalist, was unable to attend.

AWARD RECIPIENTS—Displaying top ACI awards given at a special luncheon event in their honor were Raymond C. Reese, consulting engineer, Toledo, left, and Albert T. Goldbeck, engineering consultant to National Crushed Stone Association, Washington, D. C. Mr. Reese received the Lindau award and Mr. Goldbeck was honored with the Turner medal

Mr. Goldbeck received the Henry C. Turner Medal "in recognition of more than 40 years of quiet perseverance in the extension of our knowledge of concrete for use in highways and structures." Mr. Goldbeck, a former president of ACI, recently retired as engineering director of the National Crushed Stone Association.

A winner of the National Research Council's Distinguished Service Award, he was also the first recipient of the Frank E. Richart

**MERITORIOUS PAPER—Co-awardees of 1956 Wason Medal for "most meritorious paper" were William A. Cordon, Utah State Agricultural College, left, and Lewis H. Tuthill, California State Department of Water Resources, of Sacramento**

**HONORS BESTOWED—Kenneth R. Lauer, left, co-recipient with Floyd O. Slate of the Wason medal for "noteworthy research," poses with Roy R. Clark, consulting engineer, Portland, Ore., who received the 1956 ACI Construction Practice Award**

Award of the American Society for Testing Materials. An ACI member since 1926, Mr. Goldbeck has also been a director and vice-president. He has served on numerous ACI committees and is the author of eight ACI JOURNAL papers.

Mr. Reese, consulting engineer, Toledo, was presented the Alfred E. Lindau Award "in recognition of his years of effective coordination of practice and instruction through textbooks and technical papers on reinforced concrete." In private practice since 1922, Mr. Reese earlier spent several years as an industrial engineer with the General Electric Company and has been a consultant to the Hausman Steel Company for 30 years. Educated in engineering at Massachusetts Institute of Technology and Pierce Hall, Harvard, Mr. Reese is an authoritative author in the field of reinforced concrete.

Six of his papers have appeared in ACI JOURNAL and he is author of the *CRSI Design Handbook*. An ACI member since 1936, Mr. Reese currently serves on five ACI committees including Committee 315, Detailing Reinforced Concrete Structures, of which he has been chairman 8 years.

Mr. Tuthill and Mr. Cordon received the Wason Medal for "the most meritorious paper" of the year, "Properties and Uses of Initially Retarded Concrete," which appeared in the November, 1955, ACI JOURNAL. Mr. Tuthill, who has been an ACI member since 1926, recently assumed new duties as concrete engineer of the California State Department of Water Resources. Since 1939, he had been a concrete engineer for the U. S. Bureau of Reclamation in Denver. Mr. Cordon recently resigned as research engineer for the Portland Cement Association to join the civil engineering faculty, Utah State Agricultural College. He has been an ACI member since 1937.

Mr. Lauer and Mr. Slate were co-recipients of the Wason Medal for "noteworthy research" reported in "Autogenous Healing of Cement Paste," which appeared in the June, 1956, ACI JOURNAL.

Mr. Lauer, assistant professor of civil engineering, Montana State College, joined ACI in 1948. Mr. Slate, associate professor of engineering materials at Cornell University, has been an ACI member since 1952.

ACI's Construction Practice Award was presented to Roy R. Clark for his paper "Bonneville Stilling Basin Repaired After 17 Years' Service," which appeared in the April, 1956, ACI JOURNAL. Mr. Clark, recently retired as special assistant to the dis-

trict engineer, Portland District, U. S. Army, Corps of Engineers, headed the design branch of the district for 18 years.

### Past Board Service

Retiring members of the Board of Direction were given certificates in recognition of their services. Directors who had served in 1953-57 were: Phil M. Ferguson, chairman, Department of Civil Engineering, University of Texas, Austin; Joseph F. Jelley, Rear Admiral, Director of Pacific Division, United States Navy; H. C. Ross, assistant director of research, Hydro-Electric Power Commission of Ontario, Toronto, Ont., Canada; George W. Washa, professor, Department of Mechanics, University of Wisconsin, Madison.

Retiring President Kerekes also received a plaque in recognition of his service as president of the Institute.

## *Special Events and Dallas Convention Committee*

The Dallas Convention Committee sponsored an evening cocktail hour, banquet with floor show, and dance on Wednesday evening. Grayson Gill, architectural engineer in Dallas, was toastmaster for the affair and retiring President Frank Kerekes gave the main address. President-elect, Walter H. Price, was presented with a certificate naming him an honorary colonel, issued by the governor's office in the state of Louisiana, Mr. Price's home state.

The ladies entertainment included morning and afternoon coffee hours, a tour through a special Federal Bureau of Investigation exhibit, and a luncheon and Neiman-Marcus style show.

### Willson serves as local chairman

Cedric Willson, chief engineer, Texas Industries, Inc., served as chairman of the local committee. Everett E. Knott, sales manager, Texas Lightweight Aggregates, Inc., was treasurer.

Other members of the committee and their duties were: registration—William L. Cobb, consulting engineer; general arrangements—E. S. Collins, highway engineer, Trinity Portland Cement Co.; James D. Irwin, engineer, Wamix-Wesco; and H. M. Kahn, engineer, Master Builders Co.; banquet—Tom L. Amis, president, Wamix, Inc.; Terrell R. Harper, Harper and Kemp, Architects; Jack E. Rosenlund, chief structural engineer, George L. Dahl, Architects and Engineers; and Joe Williams, engineer, Portland Cement Association. Publicity was handled by Charles E. Yeager, director of public relations, Texas Industries, Inc.

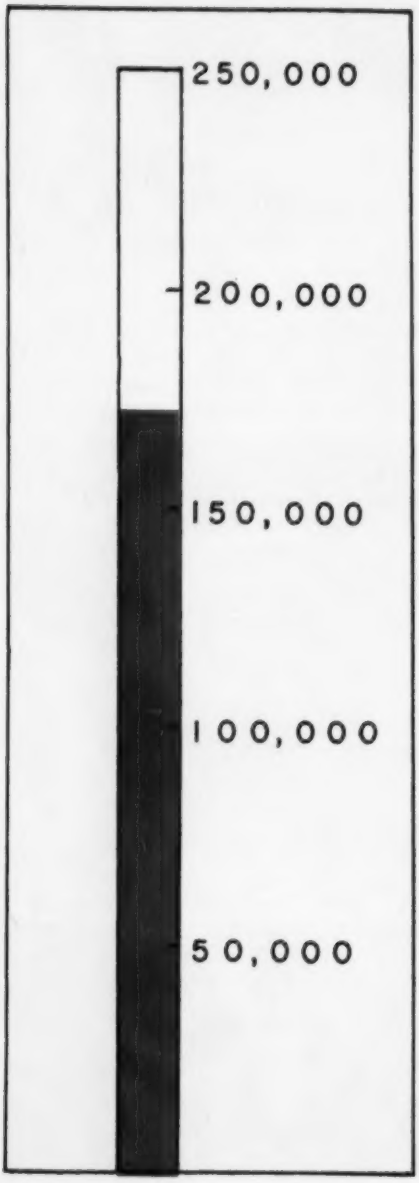
### Mrs. Gray Thomas heads ladies committee

The ladies committee included Mrs. Gray Thomas, chairman; Mrs. E. J. Demson, luncheon-style show; Mrs. Grayson Gill, coffee; and Mrs. Cedric Willson, hospitality room.

**TEXAN PLANNERS at the ACI Dallas convention were members of the local ACI committee—Grayson Gill, architect-engineer, left; Cedric Willson, chief engineer, Texas Industries, Inc., and chairman of local committee, center; and Terrell R. Harper, Harper and Kemp, architects, Dallas**

**New totals reported as**

# *fund drive continues*




ACI's Building Fund Barometer has taken a sharp upswing. Checks and pledges in hand totaled $174,764.69 as of Mar. 15, 1957. A résumé of fund contributions is given below.

### Contributions by Category

**as of March 15, 1957**

| | |
|---|---|
| Cement producers | $ 40,387.00 |
| Reinforcing steel industry | 40,000.00 |
| Engineers and architects in private practice | 33,206.59 |
| Contractors | 15,020.00 |
| Ready-mixed concrete and aggregate industry | 8,981.75 |
| Admixtures manufacturers | 6,158.93 |
| Concrete products manufacturers | 2,220.00 |
| Concrete machinery and specialty products | 1,185.00 |
| Special contributions | 1,000.00 |
| Eastern Canada | 945.42 |
| Membership at large | 610.00 |
| Total | $149,714.69 |
| Pledges in hand | 25,050.00 |
| GRAND TOTAL | $174,764.69 |

## REVIEWER NEEDED

### Spanish bulletins on cement production

Various bulletins are being received at ACI headquarters from the Instituto Técnico de la Construcción y del Cemento in Madrid, covering various aspects of cement chemistry and cement production. A volunteer reviewer is needed to keep members informed of the material in these bulletins through the "Current Reviews" section of the JOURNAL. Those interested should write the secretary of the Technical Activities Committee at ACI headquarters.

# Positions and Projects

## Sam Hobbs accepts chairmanship for 1959 ACI convention

Sam Hobbs of Arcadia, Calif., has accepted the local chairmanship for the 1959 ACI national convention scheduled for Los Angeles.

Mr. Hobbs retired last November after long service with the Portland Cement Association. His career with the PCA began in 1919 when he became one of the association's field engineers in the Boston district. He transferred to the Los Angeles district office in 1927 as field engineer, and later served as engineer of structures there. A long-time member of ACI, Mr. Hobbs conducted the first ACI regional meeting on the West Coast. He is a quarter-century member-getter.

## Friberg serves on BRAB committee

Bengt F. Friberg, consulting engineer, St. Louis, is serving on a 13-man Building Research Advisory Board committee making a study on inverted crown (street center drainage) design for the Federal Housing Administration. The study, being performed under an FHA contract with the National Academy of Sciences, will include a survey and evaluation of experiences regarding the use of the inverted crown for light traffic residential streets and alleys in new subdivisions.

## ACI participates in Georgia Tech meeting

A local area meeting, jointly sponsored by the American Concrete Institute and Portland Cement Association, was held in cooperation with the Georgia Institute of Technology as the first part of a double meeting March 4. Seventy-five structural engineers attended.

A seminar was conducted by Paul Rice, ACI technical director, who explained the new provisions and changes in the recently adopted "Building Code Requirements for Reinforced Concrete (ACI 318-56)." George Nelson, of Law-Barrow-Agee Laboratories, Inc., Atlanta, spoke on "Concrete Testing and Strength Requirements under Latest ACI Standards." Irvine E. Morris, Atlanta structural engineer, led a discussion period.

Eduardo Torroja, director of the Technical Institute of Cement Construction, Madrid, Spain, conducted the second portion of the double meeting, an evening seminar sponsored by Georgia Tech and the American Institute of Architects.

## Eberle M. Smith Associates win award

A design by Eberle M. Smith Associates, Inc., Detroit architects, for the proposed Greenfield Elementary School in Birmingham, Mich., won the top design award in the elementary school category in the Fourth Annual Design Awards program sponsored by *Progressive Architecture*. The awards were presented in New Orleans in January.

## Technical committee chairmen named

Appointment of new committee chairmen for 3-year terms was announced by ACI's Board of Direction at the Dallas convention. Their appointments, effective Feb. 24, 1957, will terminate in 1960. Included are *new* appointments only.

### Committee 115, Research

George W. Washa, University of Wisconsin, Madison, has been appointed chairman.

### Committee 212, Admixtures

Bruce E. Foster, National Bureau of Standards, Washington, D. C., is the new chairman.

### Committee 215, Fatigue of Concrete

Gene M. Nordby, Purdue University, has been appointed chairman. Dr. Nordby is presently on leave of absence from Purdue,

**Waterstop**
***in place***
***in seconds!***

LABYRINTH WATERSTOP after first pour has been made and form removed. The grooves receive the concrete from the second pour, providing an interlocking joint.

**Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form... just a few seconds and water seepage worries were over before they could ever have a chance to start.**

**LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete.**

**LABYRINTH WATERSTOPS are made of flexible polyvinyl plastic... that has superior weathering qualities, is not affected by temperature changes and chemical activity.**

**LABYRINTH WATERSTOPS are easy to work with, can be cut to any desired length. "L" and "T" joints can be welded with just a hot knife. Find out now how your costs can be cut... and end your seepage problems.**

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*Made in Canada for*
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**Toronto, Ontario**

serving as engineer of the Program for Engineering Sciences, National Science Foundation, Washington, D. C.

## Committee 314, Rigid Frame Bridges

James P. Michalos, New York University, New York, has been appointed chairman.

## Committee 318, Standard Building Code

Raymond C. Reese, consulting engineer, Toledo, Ohio, has been appointed chairman.

## Committee 612, Recommended Practice for Curing Concrete

G. E. Burnett, U. S. Bureau of Reclamation, Denver, has been appointed chairman.

## Committee 716, High-Pressure Steam Curing

Samuel B. Helms, Lehigh Portland Cement Co., Coplay, Pa., has been appointed chairman.

## PCA announces personnel changes

Portland Cement Association, Chicago, has announced organization changes affecting five members of its promotion division, under supervision of James D. Piper, vice-president for promotion.

Martin A. Lewis is now coordinator of interstate highways promotion. Assisting on technical aspects of this program is Homer A. Humphrey, senior highway consultant. Warren G. Burres has assumed Mr. Humphrey's former position as manager of the association's personnel training classes. Leo H. Corning is chief consulting structural engineer and George H. Paris is director of promotion planning and engineering services.

## Burks appointed products manager

Sam D. Burks, ACI member and author of the JOURNAL paper, "The Five-Year Temperature Record of a Thin Concrete Dam," took up new duties as products manager for the San Leandro, Calif., office

of Dewey and Almy Chemical Co. Division, W. R. Grace and Co., February 1. He will service the company's market in the 11 western states.

## New firm name announced

ACI member Ford J. Twaits and Carl H. Wittenberg, co-partners of Ford J. Twaits Co., contractors and engineers, Los Angeles, have announced that their partnership will be conducted under a new firm name, Twaits-Wittenberg Co.

## Morris, Boehmig and Tindel elect officers

I. E. Morris will continue as chairman of the board of directors of Morris, Boehmig and Tindel, Inc., consulting structural engineers, Atlanta, following a recent election. R. L. Boehmig was chosen president and T. A. Tindel, executive vice-president and secretary.

## Silverman aids small homes study

Gilbert B. Silverman of Holtzman and Silverman, Detroit, has made a grant to the University of Illinois for a housing research problem to be studied by the Small Homes Council. His donation is earmarked for a study of performance records of residential basement construction.

## Bullock takes new position

Carlos D. Bullock has joined Burgwin and Martin, consulting engineers in Topeka, as head of the structure and bridge department. Mr. Bullock was formerly regional structural engineer with Portland Cement Association, headquartered in Kansas City.

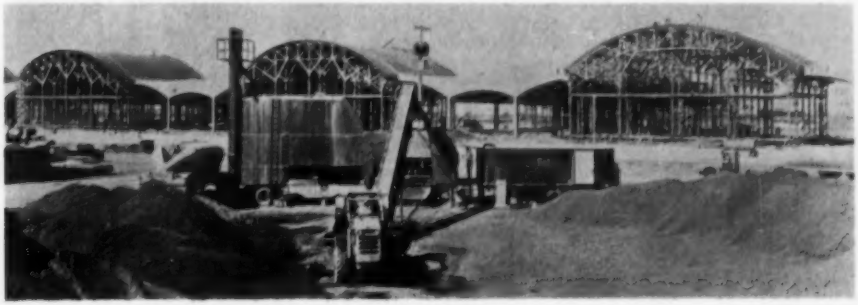
## Burggraf and Siess are research winners

Two ACI members were honored at the February convention of the American Society of Civil Engineers, Jackson, Miss., as 1956 research prize winners. They are Fred Burggraf, director of the Highway Research Board, Washington, D.C., and Chester P. Siess, research professor of civil engineering at the University of Illinois. Mr. Burggraf was honored for "his outstanding contributions to knowledge through the administration of research in highway engineering and construction materials." Mr. Seiss received an award for "his outstanding contributions to knowledge through his research on reinforced concrete slabs."

---

Supplying concrete on a job 220 miles from operations base is Noble mobile batching plant on wheels working on new $7,000,000 Boeing Airplane Co. hangar at Moses Lake, Wash. Mount Vernon Sand and Gravel Co., Mount Vernon, was awarded contract for concrete on the hangar. Three to four transit trucks handle some 350 to 400 cu yd per day of concrete required on job that will eventually run to 25,000 to 30,000 cu yd. The mobile plant can run 600 to 800 cu yd per day if necessary. The plant is charged by a scoop-loaded conveyor with one or two men required for entire operation.

Construction shown is an eight-place hangar to house B-52 jet bombers while they are being flight-tested by Boeing previous to acceptance by the U. S. Air Force. Entire hangar is reinforced concrete, as can be seen in background of the phtoograph



## T. Y. Lin named chairman of committee for world conference on prestressing; Germundsson represents ACI

ACI member Tung Yen Lin, professor of civil engineering at the University of California, Berkeley, is chairman of the general arrangements committee for the World Conference on Prestressed Concrete to be presented at the Fairmont Hotel, San Francisco, July 29 through August 2.

Others on the arrangements committee are Prof. J. W. Kelly, Prof. Alexander C. Scordelis, and Kenneth L. Downes, Jr., all of the University of California; Ben C. Gerwick, Jr., and Robert Singer of Ben C. Gerwick, Inc., San Francisco; and Harold A. Price and Jack Streblow of Basalt Rock Co., Napa, Calif.

ACI will cooperate with other organizations in the sponsorship of the one-week conference. Thor Germundsson, Portland Cement Association, Chicago, has been appointed ACI representative on the program and advisory committees.

## First educational course for construction technicians planned

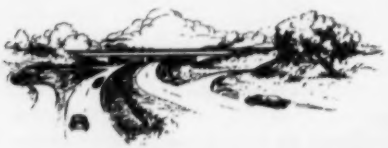
Wentworth Institute in Boston has announced the first educational course for the training of civil and highway construction technicians in New England to be inaugurated at the institute in September 1957.

The 2-year program in civil and highway construction, training students as engineering technicians, leads to an associate-in-engineering degree. The program will balance theory with practical application to enable the student to be competent either on the construction job or in the engineering office.

Andrew Canzanelli, a graduate of MIT and an associate engineer and designer with the Metropolitan District Commission of Boston for 31 years, will head the program.

## Permanente lists promotions

James C. Reilly, manager of industrial relations for Permanente Cement Co., has also been named industrial relations manager for Kaiser Gypsum Co., Oakland, Calif. Harry G. Smith, labor relations representa-

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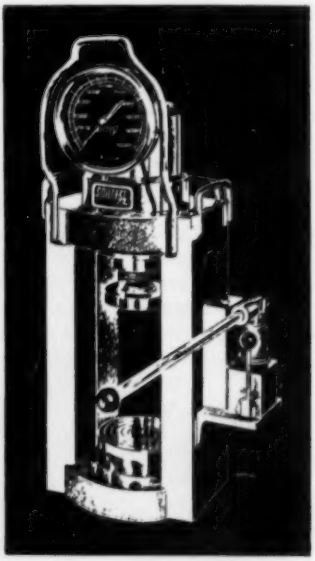

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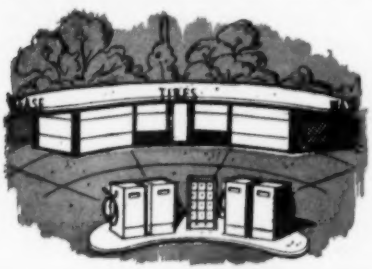

**BUILDINGS.** Clinton Welded Wire Fabric helps hold future maintenance costs to a minimum by controlling cracking, equalizing loads and preventing deterioration. As a result, this durable, dependable fabric is widely used in service stations, office buildings, schools, hospitals, apartments, residences and warehouses.

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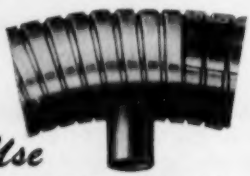
tive at the San Jose plant of Permanente, has also been appointed labor relations representative for the Cushenbury plant, the new plant to be built in New Mexico, and the Permanente-Salinas area plants of Kaiser Aluminum and Chemical Corp. Leonard R. Flicker, who has been with Permanente since 1941 as a safety inspector and senior safety engineer, has been named coordinator of safety for Permanente Cement Co. and Kaiser Gypsum Co.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## Berlin named 1958 International Congress locale

Plans are underway for the 1958 International Congress on Prestressed Concrete which will be staged in Berlin, May 5-10, 1958.

Contributions for the congress should be received by P. Gooding, general secretary, Federation Internationale de la Precontrainte, Administrative Office, Terminal House, 52 Grosvenor Gardens, London SW 1, by Aug. 15, 1957. Themes for papers have been announced as: (1) development in design methods—with special request for those dealing with experimental work on shear stresses; (2) advances in technique of sitework with particular reference to grouting, anchorages, reduction of friction, and safety measures; (3) progress in the manufacture of prestressed concrete units in factories and the use and assembling of precast units on the site; and (4) buildings and structures carried out wholly or partly in prestressed concrete since the 1955 congress, in which important developments in design or construction have been included.

Contributions should be in one of the four Congress languages—English, French, German, or Spanish—and must contain a brief summary in all four languages. Six copies are required of each contribution; maximum length is 4000 words, plus pictures and graphs.

## Miller elected Pumice Institute president

New president of the Pumice Institute is ACI member William E. Miller, Bend, Ore., owner of Central Oregon Pumice Co. The Pumice Institute is a national association organized for the purpose of developing, promoting, and advancing use of pumice products.

## August H. Lamack promoted by Laclede

August H. Lamack has been appointed assistant district manager of construction products sales for Laclede Steel Co., St. Louis. A sales engineer since 1948, Mr. Lamack has served as assistant to A. Carl Weber, St. Louis district sales manager of construction products.

Marion, Indiana Sewage Treatment Plant. Engineer—Consoer, Townsend & Associates, Chicago, Illinois; Contractor—Steigerwald & Borchert, Milwaukee, Wisc.

Temple Isaiah, Los Angeles, Calif. Archt.—Kenneth N. Lind, A.I.A.; Struc. Engr.—Brandow & Johnston; Contr.—Zimmer Construction Co.; Sub Contr.—Vagtborg Construction Co.—all of Los Angeles, Calif.

# POZZOLITH

## in concrete for quality control

**Shown here are three of many important structures built since 1932 in which Pozzolith improved engineers' control of concrete quality.**

Barrett-Lick Garage, San Francisco, Calif. Structural Engineers—Ellison and King; General Contractor—Barrett and Hilp;—both of San Francisco, Calif.

***"For a given set of materials and water-cement ratio, the unit water content (water required per cubic yard of concrete) is the most important basic factor affecting the quality of concrete".*** **ACI Committee 613, 1944 report, Page 655.**

***"The most efficient concrete is that which contains the least amount of water and cement compatible with sufficient workability and adequate quality".*** **Bureau of Reclamation current Concrete Manual, Page 269.**

**In all types of structures, Pozzolith helps engineers maintain lowest possible unit water content, closely control entrained air . . . consistency . . . rate of hardening . . . costs.**

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form obround columns
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## REVIEWER NEEDED

### Journal and Transactions of the Japan Society of Civil Engineers

*These Japanese publications are being received regularly at ACI headquarters. A volunteer reviewer is needed to keep members informed of pertinent papers in them through the "Current Reviews" section of the* JOURNAL. *Those interested should write the Secretary of the Technical Activities Committee at ACI headquarters.*

## Watstein named structural chief

David Watstein has been appointed chief of the structural engineering section of the Building Technology Division at the National Bureau of Standards, Washington, D.C. Formerly acting chief of the section, he will continue to direct the work of securing basic data on properties of masonry, concrete, and other structural materials.

Mr. Watstein is a member of the Society of Experimental Stress Analysis and the Building Institute of the National Research Council. He is active on ACI Committee 208, Bond Stress and received the Wason Medal in 1953 for his paper, "Effect of Straining Rate on the Compressive Strength and Elastic Properties of Concrete."

## IT'S A 'YURT'

### Latest Design for Ammunition Depot

"Yurt" is a new word in the vocabulary of ordnance employees at Anniston Ordnance Depot, Anniston, Ala. Four hundred and seventy-eight Yurts—constructed of reinforced concrete but patterned after the skin-over-lattice framework huts of Asiastic tribes—are new-design ammunition magazines at the depot.

Each yurt has a floor area 25 x 80 ft. The side walls are 8 ft high with vertical inner faces and battered outer faces, with an elliptical barrel arch roof having a clear span of 25 ft and intrados rise of 6 ft. Clear height at the crown is 14 ft. To get adequate strength and, at the same time minimize handling operations, Blaw-Knox Co. designed the inner formwork in four hinged sections, which are easily transported in and out of position on a truck converted into a traveler. Conventional hydraulic jacks and ratchets on each section permit adjustment for crown height and side wall spread.

Outside form panels, prefabricated into 12 ft high by 20 ft long sections, are set in place with a crane. Concrete wall thickness is maintained by steel spacers attached to the outside forms and located at the beginning of the crown. Screed rails on 10 ft centers are provided for striking off the crown.

Construction of a yurt begins with the installation of base reinforcement and placing of the floor pad and foundation footers. Emerging from the footers are the tie rods to which the steel reinforcement for rear wall, side walls, and arch is welded to form a continuous basket. The next step is to move the inner forms in to place, lock them in position and place the outer side and rear wall forms in position with a crane for the second placement of concrete.

After these forms are stripped, the front walls are formed and cast. Contractors cast two magazines a day with four sets of inside forms and three sets of outside and headwall forms.

The front wall is built in the form of a vertical triangle to act as a retaining wall for the earth blanket over the top, sides and rear of the magazine. The earth cover is 2 ft thick at the crown with slopes of 2:1 on both sides and the rear. Gravity ventilation and lightning protection are provided.

Architect-engineers for design of the structures are Black & Veatch, Kansas City, Mo. Construction is under the direction of Coosa Contractors, a joint venture of M. T. Reed Construction Co., Contractors Material Co., Inc., and Taylor-Wheless Co., all of Jackson, Miss., and Ruby Construction, Madisonville, Ky. J. M. Field is project manager.

## LOOKING AHEAD

April 18-19, 1957—Western Concrete Pipe Association, Annual Spring Meeting, Fresno Hacienda Motel, Fresno, Calif.

April 29-May 3, 1957—Seventh National Materials Handling Exposition, Convention Hall, Philadelphia, Pa.

May 1-3, 1957—Society for Experimental Stress Analysis, Spring Meeting and Exhibit, Statler Hotel, Boston, Mass.

May 5-9, 1957—American Ceramic Society, 59th Annual Meeting, Statler Hilton Hotel, Dallas, Tex.

May 20-21, 1957—37th Annual Meeting, Society of American Military Engineers, Washington, D. C.

June 3-7, 1957—American Society of Civil Engineers, National Convention, Statler Hotel, Buffalo, N. Y.

June 6-8, 1957—National Society of Professional Engineers, Annual Meeting, Statler Hilton Hotel, Dallas, Tex.

June 16-21, 1957—60th Annual Meeting, American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 17-21, 1957—American Society for Engineering Education, Annual Meeting, Cornell University, Ithaca, N. Y.

June 23-29, 1957—International Bureau of Precast Concrete, Second International Congress and Machinery Exposition, Wiesbaden, Germany

June 24-29, 1957—Concrete Reinforcing Steel Institute, Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

July 29-August 2, 1957—World Conference on Prestressed Concrete, Fairmont Hotel, San Francisco, Calif.

August 12-24, 1957—International Society of Soil Mechanics and Foundation Engineering, London, England

August 19-30, 1957—(Tentative) Seventh Pan American Highway Congress, Panama City, Panama

## Named to Lafayette advisory board

John F. Magee, president, and Robert S. Gerstell, executive vice-president, Alpha Portland Cement Co., Easton, Pa., have been appointed members of the advisory board for the evening college at Lafayette College, Easton, Pa. Mr. Magee is trustee of the college.

## Zonolite names representative

James C. Spence has been appointed New York City area representative for Zonolite Co. A civil engineering graduate of Illinois Institute of Technology, Chicago, Mr. Spence had served as an engineer with the Vermiculite Institute for the past 4 years.

## Mitchell named manufacturers' director

E. B. Mitchell, Jr., vice-president and manager of the Texas division of Lone Star Cement Corp., has been elected to the board of directors of the Texas Manufacturers Association for a 3-year term.

## Lone Star to acquire Superior Portland

Lone Star Cement Corp., New York, will acquire assets of Superior Portland Cement, Inc., Seattle, according to an announcement by H. A. Sawyer, president of Lone Star, and M. H. Nelson, executive vice-president of Superior. Lone Star operates 12 plants in the USA and has six plants in Latin America operated as foreign subsidiaries. The acquisition will extend its operations to the Pacific northwest for the first time.

## Huron Portland celebrating golden anniversary

Huron Portland Cement Co., founded Jan. 26, 1907, in a Detroit office and now operating the largest single cement mill in the world at Alpena, Mich., is celebrating its golden anniversary this year. In 1956 a total of 24 kilns produced more than 25,000 bbl of cement a day at the Alpena mill. Output will increase further this year when two large new kilns, equipped with preheaters, go into production.

# NOW—a practical pavement design with low initial cost and minimum maintenance

Continuously reinforced concrete pavements, using high strength Rail Steel bars, mean improved behavior and increased permanence of highways

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- Less prepared subgrade required
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- Longer bars mean less steel at splices
- Preplacing steel permits formless paving
- Preplaced steel in long lengths means efficient mass handling of concrete
- Costly joints eliminated
- Smooth riding—no rhythmic thuds from joints
- No pumping—no break-ups
- High yield point Rail Steel prevents deleterious cracking in winter
- Elimination of large cracks means low maintenance costs
- No discoloring tar patches at joints or cracks
- Traffic hazard of slow-moving repair crews is eliminated

For more details on continuously reinforced concrete pavement plus an interesting case history of its construction, we invite you to borrow, without charge, our 16mm color film, "Advancement in Concrete Pavement". Write or 'phone

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### Advance orders, Bound Volume 54

A 20 percent discount on the purchase price of $6 for bound copies of the forthcoming Proceedings V. 54 will be available until June 1, 1957.

Checks or money orders should be sent to the Institute office prior to that date to take advantage of the discount. The new volume will begin with the July, 1957, issue, continue through the June, 1958, issue, and be completed with the December, 1958, Part 2 issue.

### Theodore Collier promoted

Theodore F. Collier has been made vice-president of Westcott and Mapes, Inc., of New Haven. He has been in charge of the civil-structural engineering division of this 41-year-old firm since his association with it in 1950. In his new office he will continue to supervise the firm's civil, structural, and highway engineering.

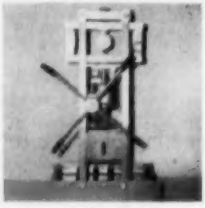
### California Portland Cement names vice-president

Richard A. Grant has been elected executive vice-president of California Portland Cement Co., Los Angeles, succeeding L. E. Bancroft who retired after 38 years of service. Mr. Bancroft retains the positions of vice-president and director. Mr. Grant is a director, vice-president, and assistant to E. E. Duque, president of the company.

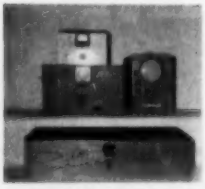
### Oregon Portland Cement expands

Oregon Portland Cement Co., Portland, has completed an expansion and modernization program amounting to over $6 million, making the firm the largest cement manufacturer in the Pacific Northwest. The company's plants, located at Oswego and Lime, now have an annual capacity in excess of 3,000,000 bbl.


## HIGHWAY TESTING APPARATUS



Flexure Machine



Sonic Apparatus

### Concrete Testers

Air Meters
Cement Testers
Kelly Ball
Compression Testers
Flexure Machines
Sonic Apparatus

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# Who's Who This Month

## Frank Kerekes

"Review of Activities During 1956," p. 913, was originally presented by Frank Kerekes at the ACI annual convention in Dallas when he concluded his year as Institute president. Dean Kerekes, well known to JOURNAL readers, is dean of faculty, Michigan College of Mining and Technology, Houghton.

## ACI Committee 617

ACI Committee 617 prepared the report, "Proposed Revision of Specifications for Concrete Pavements and Concrete Bases," that appears on p. 917. Chairman of this committee is H. F. Clemmer, District of Columbia Department of Highways, Washington, D.C.

Members of the committee are E. A. Abdun-Nur, consulting engineer, Denver; Harold Allen, Bureau of Public Roads, Washington, D.C.; A. A. Anderson, Portland Cement Association, Chicago; E. W. Bauman, National Slag Association, Washington, D.C.; John A. Bishop, U. S. Naval Civil Engineering Research and Evaluation Laboratories, Port Hueneme, Calif.; Frank B. Brown, Wire Reinforcement Institute, Washington, D.C.; A. T. Goldbeck, National Crushed Stone Association, Washington, D.C.; W. E. Hawkins, North Carolina Highway Department and Public Works Committee, Raleigh; T. E. Howell, Caterpillar Tractor Co., Peoria, Ill.; Fred Hubbard, The Standard Slag Co., Youngstown, Ohio; Theodore J. Kauer, The Homes Construction Co., Wooster, Ohio; Phillip L. Melville, Office, Chief of Engineers, Department of the Army, Washington, D.C.; Bailey Tremper, California Division of Highways, Sacramento; and Stanton Walker, National Ready Mixed Concrete Association, Washington, D.C.

## M. W. Ferguson, G. L. Kalousek, and C. W. Smith

A trio of authors, M. W. Ferguson, G. L. Kalousek, and C. W. Smith wrote "Test Results of a New Method for Evaluating Volume Changes of Concrete Masonry Units" published on p. 947.

Mr. Ferguson, who in 1926, organized Pre-Shrunk, Inc., Roanoke, Va., a concrete block plant, has been manufacturing concrete block and products continuously since that time. He was graduated from Augusta Military Institute, Ft. Defiance, Va., in 1916 and attended engineering school, Cornell University, until he left to join the army in 1917. From 1920 to 1924 he engaged in concrete highway construction in eastern Virginia and North Carolina.

He began studying volume change of concrete masonry in 1937, hoping that the investigation would lead to the reduction of volume change of concrete masonry as laid in the wall. This laboratory work led to the installation of a high-pressure curing plant in 1939. Through efforts of his company, a test method was introduced which led to the rapid method of test published by ACI Committee 716.

Mr. Kalousek, chief of the physical chemistry and solid state physics department, Owens-Illinois Glass Co., Toledo, is familiar to JOURNAL readers. Author or co-author of seven earlier papers, he has been a project director of studies on concrete at the University of Toledo. He graduated from the University of Idaho in 1930 with a BS in chemical engineering. He received MS and PhD degrees in chemistry in 1936 and 1941, respectively, from the University of Maryland. From 1930-1944, he engaged in research on the physical and chemical properties of cements and concrete at the National Bureau of Standards.

Mr. Smith, associate professor of applied mechanics, Virginia Polytechnic Institute, Blacksburg, received his BS in civil engineering at the Institute in 1947 and his MS there in 1949. He began his teaching career at the Institute with a fellowship in 1947 and later served as instructor and assistant professor of applied mechanics. He also did research through the Institute's engineering experiment station on alkali-aggregate reaction in

concrete and on corrosion rates of steel reinforcing in concrete from 1951-1956.

A member of National Society of Professional Engineers, Society of Experimental Stress Analysis, Tau Beta Pi, Chi Epsilon, Sigma Xi and Phi Kappa Phi, Mr. Smith serves as a materials consultant to private industry.

## Witold W. Zawilski

Witold W. Zawilski, structural design engineer for the Hydro-Electric Power Commission of Ontario, Toronto, is the author of "Elastic Design of Prestressed Sections in Flexure by Charts or Tables," p. 961.

A member of ACI since 1955, Mr. Zawilski received his MS in civil engineering from the Technical University of Lwow, Poland, in 1937. In 1939, his studies were interrupted by the outbreak of World War II. He served from 1940-45 as an officer with the engineers of the Second Polish Corps attached to the British Eighth Army in North Africa and Italy. In 1947 he completed his diploma thesis on a bridge structure design and obtained his MS with honors from the Polish University College in London. He then was engaged by the university as an assistant lecturer in theory of structures.

Mr. Zawilski joined Ontario Hydro at the end of 1948. He is a registered professional engineer in the Province of Ontario.

## B. G. Singh

B. G. Singh's report, "Effect of Specific Surface of Aggregate on Consistency of Concrete," p. 989, is part of a research study he completed at University College, London.

Now with the civil engineering testing laboratory in the works and hydraulics department of Port of Spain, Trinidad, British West Indies, Mr. Singh received his civil engineering degree at University College, Cardiff, in 1950. He spent the ensuing 2 years as a guest student at the university's Building Research Station. During this period he studied deterioration of portland cement in storage, and began the research on poorly graded sands which he later completed in London.

Since returning to his homeland in 1953, he has been testing soils and building materials, of which cement and concrete form a prominent part. Though a cement factory has been in operation, financed by British capital in the Port of Spain, cement is still expensive and good aggregate for concrete is poorly distributed and expensive, Mr. Singh reports. He states that the problem there is mainly designing suitable mixes with poorly graded sands and carrying out routine tests to control the quality of concrete. "Though efforts are made to apply more advanced techniques, most of our efforts are still devoted to controlling water-cement ratio and mix proportions and we are succeeding in improving the quality of concrete continuously," Mr. Singh notes.

## Walter E. Riley

Consulting engineer Walter E. Riley, who prepared "Analysis of Continuous Arches on Flexible Piers," p. 999, writes that he has a patent pending for a novel way of reducing construction cost for thin shell roofs. A 1939 graduate of the University of Pittsburgh, with a BS in CE, Mr. Riley worked as design engineer for Pittsburgh-Des Moines Steel Co. from 1939 to 1946. He later was employed as a design engineer for Allison Steel Co. of Phoenix from 1946 to 1950 before entering private practice in Phoenix.

A registered structural engineer in Arizona, he is particularly interested in indeterminate structures and those structures whose proportions are determined by elastic stability. A member of ACI since 1952, Mr. Riley is also affiliated with ASCE.

# Honor Roll

### February 1–February 28, 1957

This is the beginning of a new Honor Roll year.

You can become a part of the Honor Roll by proposing two or more new members to the Institute.

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| | |
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| S. E. Acker | 3 |
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| Louis A. Gottheil | 2 |
| N. L. Hinkson | 2 |
| Henry L. Kennedy | 2 |
| Walter H. Price | 2 |
| Abdur Rahman S. Rasul | 2 |

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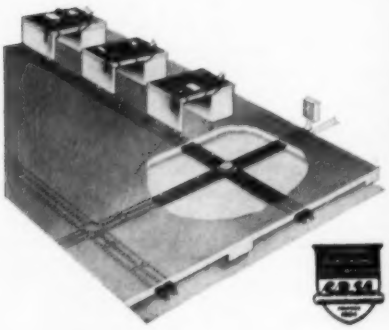
| **Structural Engineer** | Murray Erick<br>Los Angeles, California |
| **General Contractor** | C. L. Peck Company<br>Los Angeles, California |



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## Errata and addenda

The following correction should be made in "Some Effects of Carbon Dioxide on Mortars and Concrete," by I. Leber and F. A. Blakey in the September 1956 JOURNAL.

p. 299—Substitute the graphs below for Fig. 2a and 2b.

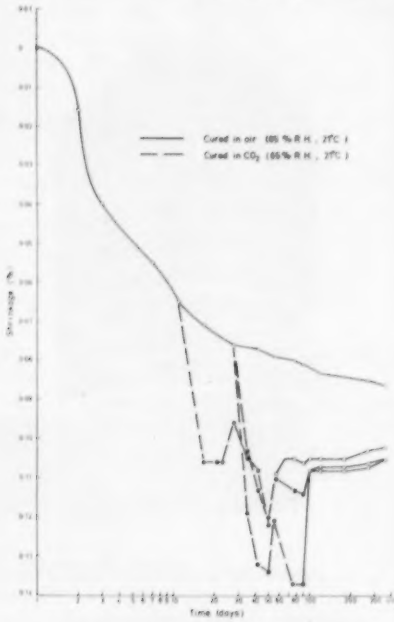


Fig. 2a—Shrinkage of mortars which have been kept in carbon dioxide after various air curing

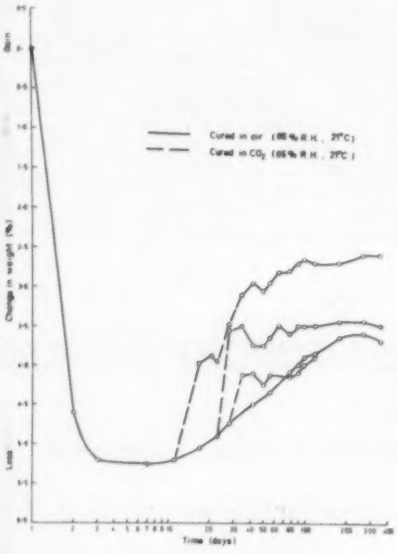


Fig. 2b—Change in weight of mortars for which shrinkage is shown in Fig. 2a

* * *

The following correction should be made in the ACI Standard "Building Code Requirements for Reinforced Concrete (ACI 318-56)" reported by ACI Committee 318, originally published in the May 1956 ACI JOURNAL, *Proc.* V. 52.

p. 922—Section 206—Concrete Aggregates, should contain paragraphs (*a*) and (*b*). Paragraph (*b*) should read as follows:

"(*b*) The maximum size of the aggregate shall be not larger than one-fifth of the narrowest dimension between sides of the forms of the member for which the concrete is to be used, nor larger than three-fourths of the minimum clear spacing between reinforcing bars."

* * *

The following addition should be made to the "Mackinac Bridge Pier Construction" by R. E. Davis, Jr. and C. E. Haltenhoff, which appeared in the December 1956 JOURNAL.

p. 595—Last paragraph under ORGANIZATION, insert: "Lee Turzillo, former executive vice-president of The Prepakt Concrete Co., was active in planning and supervision of concrete placement work until December 1955, when he formed his own firm, Lee Turzillo Contracting Co., Cleveland.

* * *

*Errata continued on p. 46*

# New Members

**The Board of Direction approved 132 Individual applications, 4 Corporations, 26 Juniors, and 16 Students, making a total of 178 new members. Considering losses due to deaths, resignations, and nonpayment of dues, the total membership on Mar. 1, 1957, was 8640.**

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WISE, JOHN C., Los Angeles, Calif. (Struct. Engr., PCA)
WITTENBURG, NORMAN S., Hollywood, Calif. (Struct. Engr., Murray Erick, Struct. Engrs.)
WOOD, L. E., El Paso, Texas (Sr. Res. Engr., Texas Highway Dept.)
YOUNG, GARLAND E., Dallas, Tex.

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COMPO, DON A., Richmond, Va. (Struct. Engr., Reynolds Metals Co.)

DARLYMPLE, D., North Balwyn, Australia (Draftsman, Public Works Dept.)
DELUCA, JOSEPH ROBERT, Oceanside, L. I., N. Y. (CE, Seelye, Stevenson, Value & Knecht, Cons. Engrs.)
EISLER, HUGH HENRY FRED, Hamilton, Ont., Canada (Constr. Engr., Field Supv., The Steel Co. of Canada, Ltd.)
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**Details on p. 38.**

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**Errata**—*Continued from p. 42*

The following correction should be made in "Shear Strength of Reinforced Concrete Frame Members Without Web Reinforcement," by JoDean Morrow and I. M. Viest, which appeared in the March 1957 JOURNAL.

p. 857—The second equation on the page should read

$$10^4 K e_u = \frac{1.116\frac{a}{d} + 0.174}{\frac{a}{d} - 0.872} \leqq 3\frac{a}{d} \text{ (always larger than zero)}$$

• • •

The following correction should be made in "Proposed Recommended Practice for the Design of Concrete Pavements," reported by ACI Committee 325 in the February 1957 JOURNAL.

p. 741—Eq. (14) should read $A_s = \frac{F L w}{2 f_s}$

## Jenkins appointed manager for Vancouver firm

A. E. Jenkins has been appointed manager of the concrete division for Evans, Coleman and Gilley Brothers, Ltd., Vancouver, B.C. This concrete division will coordinate sales and production of the organization's "truemix" concrete operations.

## Midwest conference moves headquarters

Executive offices of the Midwest Conference of Building Officials have been moved from Indianapolis to the Engineering Building at Chicago, it is announced by John V. Gallagher, executive director of the organization.


## . . . honor the construction man

Would your construction job form the basis of an ACI **Journal** paper? Every job superintendent or project engineer keeps a daily account of his job as a regular part of it. Why not use those daily reports, with a few regular progress photos, as the basis for a description of how your firm handles everyday and unusual concreting problems?

Good descriptions of construction projects, or interesting phases of construction projects, are eligible for the ACI Construction Practice Award. One reason for establishing the award in 1944 was to ". . . honor the construction man—the man whose resourcefulness comes in between the paper conception and the solid fact of a completed structure." Another was to enrich the literature of the construction field. The award is given for a construction paper of outstanding merit in the latest **Journal** volume.

Your paper may be the paper of "outstanding merit" in the next **Proceedings** volume.

## Membership in the American Concrete Institute

To facilitate prospective members in joining the Institute, membership application forms are provided. Present Members may aid by bringing these forms to the attention of those who may profit from membership advantages. The grades of membership are described overleaf.

All who have an interest in concrete are eligible for membership.

Members have at hand in Institute publications the most complete fund of knowledge on concrete. The ACI JOURNAL provides them with the latest information and ACI special publications provide them with the complete picture of specific problems. Through conventions, and regional and area meetings they are afforded the opportunity of meeting those whose experiences provide the new information, and of exchanging ideas with them.

Opportunity for service is present in technical committee activity, in contributions, or only comments, to the ACI JOURNAL, or in reviewing technical publications for material of interest to the membership.

ACI's world-wide membership is growing in extent and participation—traveling a common road toward better, more economical and durable concrete structures. ACI provides a common ground in the search for and use of new "working tools" in concrete design, manufacture, and erection—and its interpretation.

(cut here)

**Board of Direction, American Concrete Institute** **Date**_____
**P. O. Box 4754, Redford Station**
**Detroit 19, Michigan**

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| Individual Members (U. S. and Possessions, Canada, Mexico, Central America, and West Indies) | $15.00 |
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Of the annual dues, $12.00 is for the JOURNAL of the American Concrete Institute (except that dues for Junior and Student Members apply in full for the JOURNAL).

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(Individual, Corporation, Contributing, Junior, Student)

**in the American Concrete Institute. Proposed by** _____

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**Signature** _____

**For our records, please complete both sides of application.**

## EXCERPTS FROM BYLAWS: ARTICLE I—MEMBERS

*Section 1.* This Institute shall consist of Members, Corporation Members, Contributing Members, Junior Members, Student Members, and Honorary Members interested in furthering the Institute's objects as set forth in its Charter.

*Sec. 2.* A Member shall be an individual.

A Corporation Member shall be a firm, corporation, society, agency of government or other organization. A Corporation Member shall name one individual as its representative who will enjoy all membership rights and privileges.

A Contributing Member shall be an individual, firm, corporation, society, agency of government, or other organization wishing to give larger support to Institute activities through the payment of larger dues. Contributing Members, other than individuals, shall name representatives as do Corporation Members.

A Junior Member shall be a person less than 28 years old.

A Student Member shall be less than 28 years old and a student in residence at a recognized technical or engineering school.

An Honorary Member shall be a person of eminence in the field of the Institute's interest, or one who has performed extraordinarily meritorious service to the Institute.

*Sec. 3.* All classes of Members except Honorary Members and Student Members, shall be proposed by at least one Member of the Institute and elected by a two-thirds vote of the Board of Direction. An Honorary Member shall be elected by unanimous vote of the Board of Direction. A Student Member shall be proposed by a member of his school's faculty, who need not be a Member of the Institute, and elected by a two-thirds vote of the Board of Direction.

*Sec. 4.* All Members shall have all rights and privileges of membership as determined by the Board of Direction except that a Junior or Student Member shall not vote nor hold office. The status of a Student Member shall change automatically to that of Junior Member on the first anniversary of his membership succeeding the date on which he ceases to be a student in residence. The status of a Junior Member shall be changed to that of Member on the first anniversary of his membership after he becomes 28 years of age.

*Sec. 5.* Applications for and resignations from Membership and requests for change of representatives of Corporation or Contributing Memberships shall be presented in writing to the Secretary-Treasurer. Resignations may be accepted only from Members whose dues are not more than 60 days in arrears, except by special action of the Board of Direction.

(cut here)

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## Tools, Materials, Services

**Under this heading note is made of producer literature and products of presumed technical interest to ACI users of tools, equipment, materials, accessories, and special services.**

### Exterior coating

An exterior coating, reported by the company to seal any surface against outside moisture but still "exhale" interior vapors, is being introduced as Steelcote's Ply-Tex. No. 2. This polyco-based paint in a variety of colors is said to have adhesive qualities, quick drying ability and resistance to heat and salt-air corrosion.—Polyco-Monomer Department, Chemical Division, The Bordon Co., 350 Madison Ave., New York 17, N. Y.

### Silicone paint

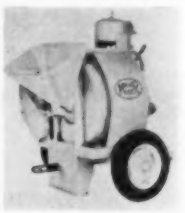
Now on the market is a cement powder paint that incorporates silicone. This product, called Silitex, S. F., is said by its manufacturer to be unaffected by most acids and chemicals, highly water resistant, and a paint that penetrates into microscopic pores of the most porous masonry.—Siliphane Corp. of America, 10 E. 40th St., New York, N. Y.

### Form equipment

Two catalogs, describing in detail different lines of forming equipment have been issued by Symons. One catalog shows the firm's line of Mag-Ply forms and the other illustrates Symons Steel-ply forms. Both kinds utilize plastic coated plywood with steel used as a frame to enclose one type, and magnesium the other. Catalogs contain on-the-job photos of each type of form along with information on advantages and assembly. Also illustrated are various details of corner, pilaster, and filler arrangements.—Symons Clamp and Manufacturing Co., 4249 Diversey Ave., Chicago, Ill.

### Non-tilting concrete mixer

A non-tilting concrete mixer featuring a drum 36 in. diameter by 27 in. wide, with capacity of 3½ cu ft of mixed concrete, plus 10 percent overload, is available.



The roller rack is of the channel type. Drum rollers and countershaft bearings are Sealmaster. Charging hopper is equipped with a sliding gate with a large opening permitting fast charging. The discharge opening is 14 in. and the one piece discharge chute is 25 in. high to facilitate loading into wheelbarrows. The mixer has a Briggs and Stratton engine, rated at 4.5 hp at 2700 rpm. There is a V-belt drive to the countershaft and a hinged base is provided for declutching. Disc type wheels are Timken equipped and the axle is mounted on coil springs. The calibrated syphon-type water tank has a capacity of 6 gal.—Muller Machinery Co., Inc., Metuchen, N. J.

### Finishing machine

A small four-blade concrete finishing machine—smallest in a line of three power trowels—is the "Superior Midget." It weighs only 75 lb. The machine is small enough to pass through narrow doorways and light enough for one man to carry up or down stairs, says the manufacturer. A crank adjustment permits operator to switch blade pitch while unit is in motion—thereby floating and troweling concrete in one nonstop operation. The crank may be used to change blade pitch up to 30 deg for polishing purposes. The unit is powered by a 1.5-hp gasoline motor and has a blade sweep diameter of 23 in. In covering small areas such as sidewalks, patios, garages and basements, the machine works effectively to within an inch of walls and borders, claims the firm.—Superior Cement Tool Corp., 11616 Wright Rd., Lynwood, Calif.

### Portable spraying

Compressed-air machine, designed primarily for "Colorcreting" but said by its manufacturer to be capable of other masonry-renovation tasks, is called "M-P." These tasks are to stucco, clean, sand blast, basecoat. The material, whether stucco, Colorcrete, sand or water—is mixed in dual tanks mounted on the machine and forced through a hose to a discharge nozzle where it is mixed with compressed air from another hose. Pressure can be regulated to produce the desired degree or surface fineness or roughness, it is claimed, for applications up to 90 ft high.—Colorcrete Industries, Inc., 323 Ottawa Ave., Holland, Mich.

### Truck mixer power take-off

Two-speed, right angle gear drive for front power take-off and power-tower midtransmission for truck mixers incorporates a pair of multiple disc clutches, running-in-oil. Two-speed operation enables drivers to shift from drum mixing speed to agitating speed without shifting gears. Whether stationary or declutched, the front end power take-off design permits drum motion at all times. Drum rotation is stopped by shifting the cab control to the neutral position or by utilizing the remote control on the transmission. The front end drive pulley shafts are both supported in two substantial bearings, and the multiple steel cable V-belts eliminate belt stretch and assure long life. The manufacturer claims that the front engine drive mixer transmission requires only three universal joints and one mid-ship bearing which results in minimum maintenance and replacements. —Worthington Corp., Harrison, N. J.

## ALPHABETICAL LIST OF ADVERTISERS

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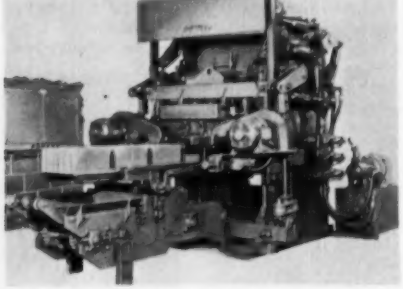
### Block production machine

Plain pallet, hydraulic two-block machine is being marketed as the "Jot". The manufacturer claims that the machine, featuring hydraulic drive, will produce 600 quality blocks per hr with a minimum of



maintenance and upkeep. Its frame has full 1-in. side plates, braced with plate and structural members. Oversized motors, pumps, shafts, and single acting cylinders are standard equipment. All working parts are accessible and no pit is required. Full height molds can be changed in 20 min., others in 30 min. or less, say its makers.—Gene Olsen Corp., 432 Grace St., Adrian, Mich.

### Formwork literature

Several labor-saving items have been described in a plywood form leaflet available from the manufacturer. —Simplex Forms System, Inc., 2500 N. Main St., Rockford, Ill.

### Rubber joints for pipe

Rexon "K" gaskets, a rubber joint for coupling standard small diameter bell and spigot concrete sewer pipe, is illustrated and described in a 4-page brochure. It contains engineering data and diagrams showing how these gaskets provide flexible joints by eliminating the need of more expensive pipe manufactured specially for use with conventional rubber gaskets. The gaskets are for pipe from 4 to 24 in. in diameter.—Hamilton Kent Manufacturing Co., 427 West Grant St., Kent, Ohio.

### Statistical abstract

Available from the U. S. Department of Commerce for $3.75 is the department's 1956 *Statistical Abstract*. The 77th annual edition contains 1065 pages and half a million facts with a 40-page index of 6000 varied subjects from "abrasives to zirconium." The bound volume's 34 chapters were compiled by the census bureau in collaboration with 83 government agencies and 56 private firms and research organizations.—U. S. Department of Commerce, Washington 25, D. C.

# Reinforced Concrete Design

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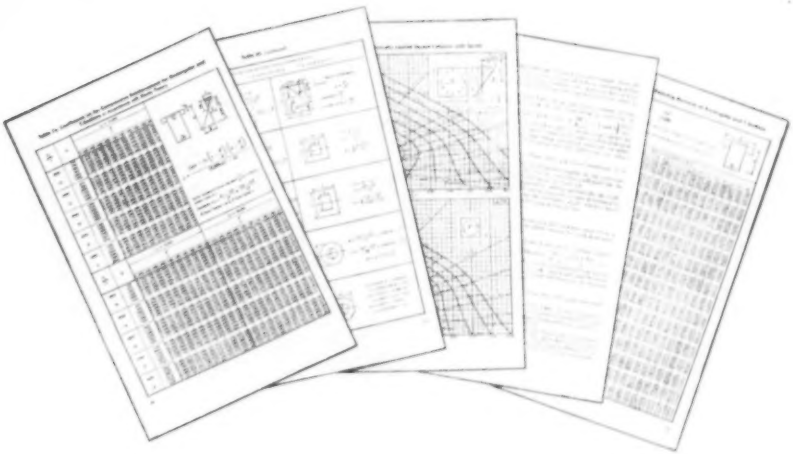

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